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ISSUE THREE 2020

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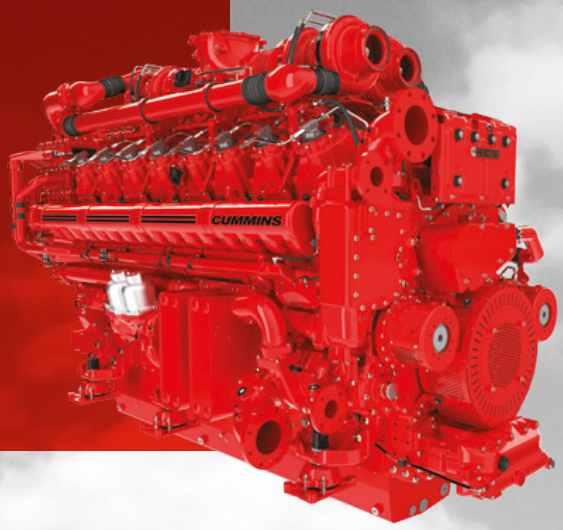

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Letter from the Editor

Josephine Cordero Sapién, Editor-in-chief

InnoTrans has been going and growing ever since it was first held in 1996 and this is the first year it has had to be postponed. We are all keeping our fingers crossed that it will be able to go ahead in April 2021 and that we can have a normal InnoTrans 2022 in September of that year.

In this issue we're taking a look back at InnoTrans 2000 to find out about some of the highlights from the show 20 years ago.

There are also some aspects of InnoTrans 2020 that are still taking place this year: one of the show's main pillars – which started in 2000 – is the Convention and it's going digital. Find out all about that on p. 15.

We have an interview with the Managing Director of DVF, Dr Heike van Hoorn, and the Chief Executive Officer of VDB, Dr Ben Möbius about the digital Convention (p. 11).
One of the major impacts on the rail sector that coronavirus has caused is the complete collapse in passenger numbers and the resulting government intervention to make sure services keep going. In the UK, Emergency Measures Agreements have been put in place, which are due to expire on 20 September. Our editor-in-chief interviewed railway engineer and lecturer at BCRRE, Gareth Dennis, about the death of franchising, what will come next, and the structural problems faced by Britain's railways (p. 26).

Many of our other contributions discuss how they have changed their working practices as a result of this health crisis and how they have responded to find new opportunities. Echoing the words of Gareth Dennis, the railways are a public service and this crisis has once again demonstrated as much. It is vital that they are adequately funded and that there is project certainty so that the entire supply chain can weather this storm.

We are publishing issue 4 of our magazine in November. As always, we aim to keep you informed with the most relevant and up-to-date news in the rail industry.

If you would like to be represented on our website or in either of these magazines, please contact Andrew Lush at al@railway-news.com.

Please enjoy our 3rd issue of 2020!

Josephine Cordero Sapién, editor-in-chief

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Issue Three 2020

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Editorial Features

Safe Travels
Masks in the Time of Coronavirus

Korita Aviation, a member of Direct Aviation Group which is headquartered in the Netherlands, manufactures rail catering equipment such as catering trolleys and containers as well as catering and cooling drawers. Responding quickly to the new circumstances we find ourselves in, Korita has taken the step to team up with a manufacturer to sell disposable face masks. We spoke to Business Excellence Manager, Samantha Collas, to find out more.

Railway-News: In England, face coverings became mandatory on public transport on 15 June, the Netherlands on 1 June, while Germany introduced this requirement back in April as a way to keep passengers safe during the coronavirus crisis.

You have now started working with a manufacturer to supply Type II disposable face masks to the rail industry. What exactly are Type II masks?

Korita Aviation: Type II refers to the bacterial filtration efficiency, a 'Type II' disposable face mask has a Bacterial Filtration Efficiency (BFE) of ≥98% and a 'Type I' disposable face mask has a Bacterial Filtration Efficiency (BFE) of ≥95%.

The manufacturer we have partnered with also manufactures Type I disposable face masks so we can also supply these as well, should this be preferred.

RN: You are selling these masks in batches of 200,000 or more, meaning you are not selling them to the end-user directly. Who are your key customers? Train operating companies or third parties?

KA: It's diverse. For the rail industry it includes operators and third parties and the same applies to aviation sector. Interestingly, other industry segments have also reached out to us, as we can accommodate large quantities

with short lead times. In addition to this, a 'Type II' disposable face mask is also suitable for use by medical professionals in a medical setting, so it really has opened up other sectors outside of our usual business sectors as well.

RN: We know you from your catering trolleys and containers. How did you reach the decision to sell masks?

KA: This is such an important question for me to answer. Our manufacturing facility for our galley insert equipment is based in Suzhou, PR China. In January this year, as my colleagues went to visit their families for the Chinese New Year public holiday, COVID-19 became widespread across China. So, for us, we really had to implement measures quickly and already start the learning process about reducing the transmission of COVID-19. Thankfully, none of our employees have been infected.

I wrote a nice article about our experience which I welcome all readers to view. You will also notice that all our employees are wearing disposable face masks! Feel free to read it here.

Given our experience, it was natural that many of our longstanding customers reached out to us for support and these initial enquiries really led us to look for a credible manufacturer for disposable face masks.

Our reputation for delivering quality galley insert equipment and excellent customer service, meant that we had to be certain that the manufacturer would be able to be aligned with our core values as well. We were committed to learning as much as possible, conducting extensive due diligence to find a manufacturer who would be able to meet expectations on all fronts. This was not easy as we wanted to really be able to offer disposable face masks that offered the user a minimum Bacterial Filtration Efficiency (BFE) of ≥95% (Type I) and ideally a Bacterial Filtration Efficiency (BFE) of ≥98% (Type II). We did it though!

I must say throughout this journey, staying true to the core value of locating a quality product was essential. During the entire period of due diligence there have been differences of opinions with regard to the use of face masks and their protective capability with respect to COVID-19. It is clear, as virologists learn more about COVID-19, face masks do have a part to play, particularly in locations where social distancing simply isn't possible.

Whilst we still do not know just how important the role of face masks are, we as a company have opted to promote Type II, as this offers the user Bacterial Filtration Efficiency (BFE) of ≥98% for up to four hours of continuous use. We do understand that some business partners may prefer to opt for a Bacterial Filtration Efficiency (BFE) of ≥95%, which is why we selected a manufacturer who manufacturers Type I as well. We leave the choice of Type I/Type II up to our customers.

RN: Your masks have the CE marking. Are you selling them throughout the EEA?

KA: Yes.

RN: Restrictions on travel have eased and more businesses have opened, leading to increasing passenger numbers. But many people remain cautious. Do you think face coverings like this will become a more established part of Western culture even after this public health crisis is over?

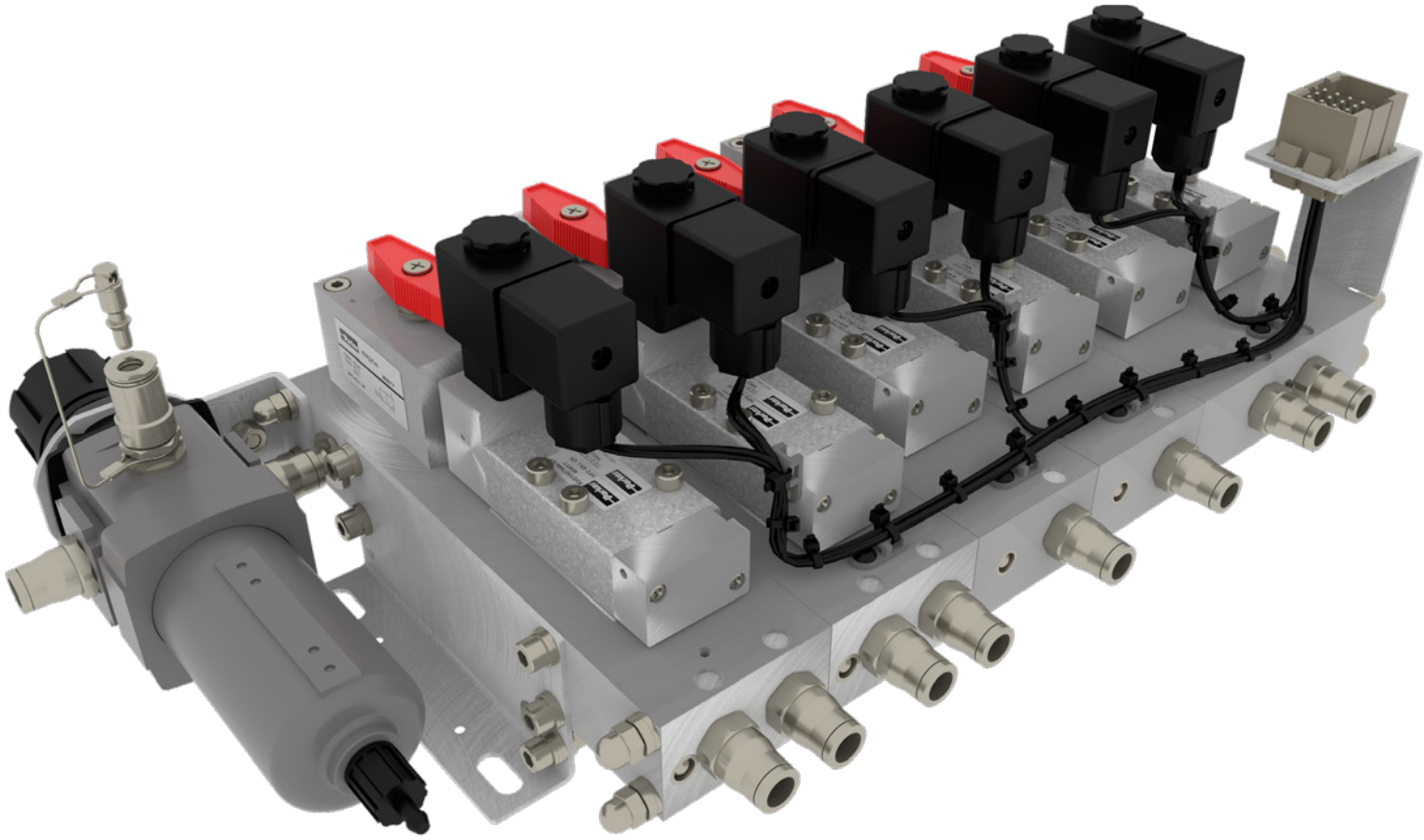
KA: I do believe that it will be more customary to see face masks being worn in public even after the pandemic is over. We have all learnt from the COVID-19 pandemic. Our learning will continue as scientists develop a greater understanding of this virus and the potential for future pandemics of this nature.

RN: Do you have any tips for passengers with glasses or those suffering from asthma about how to make the experience of wearing a face mask as pleasant as possible?

KA: This one is really for the medical professionals to advise on. From my personal experience, it is a case of wearing them correctly and getting used to it. Protecting others is at the forefront of my mind whenever I wear a face mask. I always think about all the heroes out there who have had to wear full protective clothing to save lives, so to put a face mask on is no hardship really.

"I always think about all the heroes out there who have had to wear full protective clothing to save lives, so to put a face mask on is no hardship really."

KORITA aviation



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InnoTrans Supports Digital Exchange


Dr. Heike van Hoorn,
DVF-Managing Director


Dr. Ben Möbius,
VDB-Chief Executive Officer

In the current interview DVF (Deutsches Verkehrsforum e.V.) CEO Dr Heike van Hoorn and Dr Ben Möbius, General Manager of Verband der Eisenbahnindustrie in Deutschland (VDB), talk about their goals for the digital convention that will take place in September 2020.

InnoTrans was postponed from September 2020 to April 2021. Dr Möbius, your association, the VDB, and the DVF are now planning a digital programme for the autumn. What significance does this kind of communication have for your industry even in times of crisis?

Dr. Möbius: Very high. VDB fully supports the painful but absolutely correct decision to postpone InnoTrans until next year. However, the postponement of the fair does not necessarily mean that the complete programme will disappear from the scene in autumn. Climate-friendly, digital and networked mobility does not lose its relevance due to the crisis, quite the contrary. Because realising the clean mobility of the future together with partners all over the world - that is the spirit of InnoTrans and that remains our mission. That is why we have an idea: why not use this year's traditional trade fair date for digital

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communication. In other words, to talk to customers all over the world, to gain the trust of passengers and to support politicians as a strong partner for Clean Mobility. By the way, I am convinced that the InnoTrans brand is so outstanding that it also works excellently in digital terms. We would like to use this potential in autumn for the innovations and concerns of the railway industry in Germany.

Dr. v. Hoorn, you are offering your InnoTrans Forums digitally on 23 and 24 September, the original date of InnoTrans 2020. What made you as DVF decide to do this?

Dr. v. Hoorn: The Corona crisis has hit all companies, especially trade fair organisers, suddenly and hard. But right now we can prove that we are present and offer added value for our customers and members despite the ban on contact and meetings. Digitalisation makes it possible. We therefore expressly welcomed the fact that Messe Berlin did not cancel the important leading international trade fair InnoTrans completely, but had the courage to postpone it until April next year. However, since September is the traditional month for InnoTrans for the rail industry, we would like to set an example with our forums. It's great that Messe Berlin is involved and supports this!

How exactly do the digital forums work?

Dr. v. Hoorn: In the meantime, we at DVF have gained a lot of experience with webinars and video talks as organizers. By the way, these are excellently accepted, whether by our members, stakeholders or press representatives. We all stay up to date and, above all, stay in touch. We would like to offer our two

industry forums as video talks. As usual, the audience can follow an exciting discussion between the panelists. Even questions can be directed to the podium via another tool without being on site. We hope for a high number of participants here as well.

What goals are you pursuing with a digital offer and which target group do you want to address with it?

Dr. Möbius: Basically three goals: Firstly, especially in times of crisis, it is essential to exchange information with our partners worldwide. That's why a digital forum in the fall is to serve as a forum for professional exchange. Online product presentation, specialist forums with an international audience, discussions between customers and manufacturers - all this will help to further advance our common mission of mobility for the future. I know that some trade fair experts see digital formats more as a dinghy. But we want to make it clear: Our industry remains capable of action, it remains innovative - and it looks ahead.

Secondly, we want to focus on the dialogue with politicians. Also, but not only during the crisis, the railway industry is of great strategic importance for our country and for the EU. In the second half of 2020, Germany will hold the European Council Presidency, and climate protection is right at the top of the agenda. And rightly so. After all, it is not acceptable that some people believe they have to overcome the corona economic crisis at the expense of climate protection. You cannot fight one crisis by intensifying another. Therefore: Combine economic recovery and climate protection. We want to show how this can be done in practice.

Thirdly, we can never draw attention to our world-leading trade fair here in Berlin early enough. So the digital offering is also intended to be a kind of amuse-gueule for InnoTrans in April 2021.

What thematic focus would you like to set for your digital programme?

Dr. Möbius: I think it will be about details and open discourse. How, for example, can innovations in the railway industry further improve health protection in public transport? - Why and how must ETCS be introduced very quickly now? - Ultimately, everything will contribute to our core question: How can the digital railways dovetail the re-launch of the economy with the ramp-up of climate technologies? -The railway industry provides solutions to two major crises of our time: the climate crisis, but also the corona crisis. Innovations are a good answer to both challenges. Because anyone who invests in emission-free, digital mobility now will establish a new, more sustainable economy.

In the current situation, mobility is currently in an exciting phase of transformation. What topics have you selected?

Dr. v. Hoorn: For us as DVF and thus as a mobility industry, it is enormously important that we do not slacken our efforts to drive forward the innovation and modernisation of our sector despite the profound crisis. This is essential for our society from a competitive, industrial and environmental point of view. This is why the Federal Government must not cut back on its investment projects, even though the financial burdens from the Corona crisis are so enormous. Investments in the transport sector pay off for our future. That is why our first topic is "Using the investment ramp-up in a planned and speedy manner - for a digital and expanded rail network". With regard to the International Bus Forum, we would like to take a look at the e-bus and its integration into mobility concepts. A really very exciting topic that has the potential for controversial discussions.

The idea of a digital convention met with great interest in the industry. What added value do you hope to achieve, also with regard to your forums at InnoTrans 2021?

Dr. v. Hoorn: We see the format as a preview, as a showcase for the actual trade fair, also to arouse anticipation of a personal reunion of the entire industry a few months later. After all, one thing is certain: this global crisis will pass and we will probably shape the future with a slightly different perspective, but we will shape the future. The topics of innovation, climate and environmental protection and mobility will remain with us. Finally, let us look into the future. Which three aspects will be the ones that will shape the mobility economy as a result of the lessons learned from the current pandemic? Dr. v. Hoorn: This is a look into the crystal ball. I personally believe that there is one thing in particular that we appreciate much more: what freedom and, inextricably linked with it, mobility mean. It is to be hoped that people feel a certain gratitude for the achievements of the transport industry. After all, without mobility offers, no food, medicines and doctors would be able to be where they are needed. The mobility industry has proven that it can be relied upon!

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InnoTrans 2020: The Convention Goes Digital

Although InnoTrans 2020 has been postponed to April 2021, aspects of the event can still go ahead. Parts of the InnoTrans Convention will take place digitally.

The German Transport Forum (Deutsches Verkehrsforum DVF) events will take place on their original dates. It is organising two specialist forums as video talks. These will give an outlook on InnoTrans 2021.

The German Railway Industry Association (Verband der Bahnindustrie in Deutschland e.V. VBD) will also offer digital events.

Dialog Forum: Rail Revolution 4.0: Picking up speed after the crisis

- **23 September 2020**
- **10am–noon**
- **Organised by VBD**

Dialog Forum: Rail Revolution 4.0: Using investment run-up strategically – to quickly realise a digital and expanded rail network

The DVF made the following remarks about its event: "In the summer of 2020 Germany reported an economic downturn of historic proportions. The coronavirus has infected the German economy. The economic situation will cause a foreseeable shortfall in state revenues, and short-term spending on economic stimulus packages will increase. At the same time promoting long-term investment is necessary to help ensure speedy relief in the overall economic situation. Railway projects play a key role in this context.

In our video talk we want to discuss how projects are prioritised, while weighing economic and capacity effects. What kind of investment strategies does the digitalisation of networks and operations require? How much construction and modernisation must the rail network be able to tolerate? How can processes and construction sites be optimised? These are the topics we want to discuss on the podium together with you and the experts."

The topics that will be discussed during this video talk are 'How can projects be sensibly prioritised?' and 'How much construction and modernisation can we achieve?'. Speakers include Soren Bartol, Member of the German Bundestag (SPD), Dr Tobias Heinemann from Transdev, Dr Karl Runge from Vossloh, Winfried Hermann, Minister of Transport for the state of Baden-Wurttemberg, Ronald Pofalla, DB's Head of Infrastructure and a Member of the Executive Board at Deutsches Verkehrsforum, and Larissa Zeichhardt, from LAT Funkanlagen-Service.

- **23 September 2020**
- **2pm–3:30pm**
- **Organised by VBD**

International Bus Forum: Is the future electric? Strategies for e-buses between climate protection and austerity dictates

The DVF said: "Bus transport is crucial to serving both public transport and long-distance travel needs. Due to its flexibility and capacity to bundle resources it will also be integral to transport systems in the future. However, the climate protection goals set forth by the EU and federal government can only be met by consistently converting bus fleets into alternative powertrains.

Transport companies have already taken action and for a number of years have been trialling electric buses. Recent technological advances have resulted in huge progress being made in the fields of powertrains, energy storage, range management and charging points. The industry has clearly signalled its desire to fully convert its fleets, a part of which is to be assisted by public development programmes.

What is the climate protection impact of electric buses on transport? Do alternatives to electric buses exist? What are the demands being placed on new bus generations? What are the strategies being pursued by manufacturers, transport companies, and political decision-makers to get a transition to alternative powertrains in bus transport under way? Should one reconsider converting bus fleets as a result of the economic burden of Covid-19? What is the funding framework and what kind of innovation is required? These are just some of the topics that will be discussed in the video talk."

Dr Rolf Erfurt from Berliner Verkehrsbetriebe (BVG) will make introductory remarks, before Dr Tamara Zieschang, State Secretary of Transport and Digital Infrastructure will kick off the presentations. There will then be a panel discussion on 'Is the future electric?' with the following participants: Dr Rolf Erfurt, Andre Schwammlein, Managing Director at Flixmobility, Dr Tamara Zieschang, adn Dr Frederik Zohm, Director of Research and Development at Man Truck& Bus SE.

- **24 September 2020**
- **2pm–3:30pm**
- **Organised by VBD**

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Clean and Green – In Conversation with Camira about COVID and the Future

Railway-News: What are some rail projects Camira has worked on?

Camira: As a global brand, we work with operators across the world including Queensland Rail, RATP in France, Belgian Rail, LA Metro and Belarusian Rail. Closer to home, we've most recently completed a project with Avanti West Coast and we are proud to have produced fabrics for LNER Azuma, Northern Rail, TransPennine Rail, TfW – Wales & Borders, West Midlands, Govia – Thameslink and Southern, GWR and Mersey Rail, to name a few!
Here in the UK though, we're best known for supplying wire-woven wool moquette fabrics to TfL for the London Underground and Overground. Most recently, we were commissioned to produce a wire woven moquette for the Elizabeth Line, which we developed alongside British design studio, Wallace Sewell. In keeping with the royal name of the line, regal purple is the dominant colour on the Elizabeth Line branding, which is carried right through to the fabric design itself. For us, we pride ourselves on our transport capabilities. Our in-house design studio works in close partnership with professional design houses and operators to create the most appropriate fabric solutions, not only in terms of colour and appearance, but also in meeting specific technical requirements, most notably flammability performance. For operators looking for something special, a bespoke design or branded fabric can add personality and flair to a vehicle interior.

RN: Can you give us an overview of how production has been affected for Camira as a result of coronavirus?

C: Clearly, while it hasn't been "business as usual" during this period, we have been able to maintain ongoing service throughout, continuing to distribute fabrics into all regions, and – apart from two brief interruptions in the UK and in Lithuania – continuing to produce fabrics to demand. Different segments have been affected to different degrees – in Commercial Interiors we have seen more demand for vertical fabrics for privacy screens, while we've also benefited from the move to home office working; in Transport, we've seen a dip in coach-related sales due to the effects on tourism and travel, while rail projects due to their longer-term nature have remained on track (no pun intended).

RN: Hygiene is a major talking point now on public transport, as one of the tools we have to keep each other safe. Have you seen a shift in enquiries towards more hygiene-oriented fabrics? You have published a cleaning and disinfecting guide and all of your fabrics can be cleaned and disinfected with soap and water, for example, but your wool products won't take bleach.

C: Understandably, cleaning and disinfection have become hot topics in the wake of Covid-19, with a new emphasis on hygiene as an important way in which to help prevent the spread of the virus, especially on public transport. As the industry works to reassure passengers that it is safe to travel by bus, coach and rail, we've made

it our duty to educate our customers on how they can clean and disinfect our fabrics effectively.

Most recently, we have released a dedicated guide to cleaning and disinfecting our transport fabrics, which can be found on our website. Perhaps contrary to popular belief, viruses do not survive as well on fabrics, as they do on frequently touched hard surfaces such as plastics, laminates, metal and glass. On textiles, viruses can get trapped and therefore have reduced likelihood of spreading. Subsequently, operators will need to ensure more attention is given to the regular cleaning and disinfection of grab handles, seat trays and door release buttons, for example. Of course, there are further ways to reduce the risk of textiles with similar protocols.

As you rightly flag, bleach is not suitable for use on woollen products but what wool does love is steam. What we have to remember is that wool is nature's ultra-intelligent fibre type. It has in-built health properties making it allergy and asthma safe as well as this, it improves interior air quality. With this in mind, it makes sense that this fibre type would prefer an all-natural, chemical free disinfection method. With steam cleaning, its high-pressure and high-temperature water vapour not only disinfects, but also revives the inherent spring and elasticity of wool, so it looks far superior to other types of fabric when steamed. Wool also has enhanced flame-retardant properties – especially in relation to spread of flame and smoke density/toxicity, so it wins out in this area compared to vinyl.

RN: What, generally, has the knock-on effect of coronavirus been for you? Rail projects often have long implementation periods – have you seen a big change in order volumes?

C: As you say, rail projects do have long implementation periods and as such, the rail sector has probably seen the least impact from COVID-19 so far. With major projects set for completion in 2–3 years' time, they need to keep moving. Yes, there have been a few delays but the majority of projects that were in the pipeline for 2019 are still very much in motion. This is optimistic as we look ahead to the future.

RN: Has this public health crisis changed the way you do things that you will maintain long-term?

C: The pandemic has certainly prompted us to home in on our top priorities as a business. Having to respond to rapidly changing circumstances within over 80 countries, we have had to move at a faster pace – pulling together educational tools such as our transport cleaning guide, collating our anti-microbial fabrics and conducting webinars, for example. Projects have very much been based around what our customers need here and now. To understand this, more regular communication between multiple departments has been essential and therefore this will be pivotal moving forward, as we start to flex our new work lives between both the home and the office.

RN: What have been the major take-aways with regards to how you do business?

C: Looking at the bigger picture is an obvious takeaway. We cannot simply focus on developing new products; we need to constantly strive towards innovative solutions to everyday life. Now that the virus is set to be a part of our life for the foreseeable future, hygiene and sanitation will continue to be a focus whilst sustainability and flame retardancy will be fundamental design principles.

> "Viruses do not survive as well on fabrics, as they do on frequently touched hard surfaces such as plastics, laminates, metal and glass"

Ultimately, we need to retain a dynamic approach that allows us to be flexible to our customers' changing needs.

RN: Many companies time product launches to coincide with InnoTrans, which has obviously been moved to April 2021. Are there new products Camira is bringing to market?

C: We'll be presenting our full portfolio of fabric capabilities for railway interiors and clearly have more time to create further product responses to the new world order we now find ourselves in. We're also looking forward to continuing to work with Deutsche Bahn who are showcasing the evolution of their concept train for the future (Ideenzug).

RN: What are the trends in the fabrics sector?

C: As mentioned above, our heightened sense of hygiene and sanitation will undoubtedly be a trend for months, if not years to come. As well as adopting more stringent cleaning and disinfection protocols, we expect rail operators will look to adapt carriage interiors to enable greater personal space for passengers. Ensuring a higher level of privacy and protection whilst being careful not to remove the inviting, homely atmosphere of the traditional carriage will be key. Naturally, hard surfaces will still combine with soft surfaces to create this look and feel, for example, plastic case seating with individual fabric screens. After all, part of the pleasure of train travel is comfort and design which textiles are a key part of.

In terms of the fabrics themselves, operators will not only be keen to understand the anti-microbial properties of materials, we expect a greater emphasis to be placed on the wellbeing of passengers. Subsequently, wool moquette will continue to be a popular choice with its natural in-built health properties.

For those looking for the aesthetics of a flat woven fabric with the durability of a plush moquette, we anticipate fabrics such as our Hybrid product being a hit. Hybrid is wire woven using wool making it robust

"We're also looking forward to continuing to work with Deutsche Bahn who are showcasing the evolution of their concept train for the future (Ideenzug)."

and lightweight, with sustainable credentials. Expertly woven, its double-density all-loop face is designed to withstand the demands of today's transport world with its high-performance capabilities and enhanced strength, whilst its wool-rich composition enhances the air quality of rail interiors.

RN: Are customers changing what they're asking for, a greater focus on sustainability (congratulations on winning the Green Materials category in the 2020 HiP Awards, by the way!)?

C: With an ever-increasing need to embrace sustainability in each element of our lives, operators are keen to adopt this within their designs from the offset. We strongly believe that Hybrid marks the future of transport textiles with its sustainable credentials but there are many more products within our portfolio that meet this requirement.

In regards to our HiP Award win, this was actually for one of our contract fabrics. Oceanic is our very first fabric to contain recycled plastic marine waste. A revolutionary product, this takes our mission to reduce single-use plastic one step further as we have actually been producing recycled PET fabrics for over twenty years. Looking to the future, we continue to explore the possibilities of upcycling raw waste materials within our product portfolio. Watch this space!

Camira are makers, designers and manufacturers of textiles, developing fabrics for the contract sector – including offices and schools, hotels, retail and hospitals – as well as for passenger transport, such as bus, coach and rail.

Camira is a privately-owned UK textile group founded in 1974 under the name Camborne Fabrics, but its heritage goes back to 1783 through various acquisitions. Until a management buy-out in 2006, the company was a subsidiary of Interface, an international manufacturer of textile modular floor coverings, for almost ten years. Camira extended its reach into the transport industry in 2003, first with the acquisition of British Furtex Fabrics, then in 2007 with the acquisition of the market leader John Holdsworth & Co.

Today, Camira produces around 8 million metres of fabric for sale in over 80 countries. It is headquartered in Mirfield, West Yorkshire, England. The company has manufacturing facilities in the UK and Lithuania, offices and showrooms in Europe, North America, Australia and China and a global network of account managers and specialist dealers.

Camira has received numerous awards to date. The company has won five prestigious Queen's Awards, including the Queen's Award for Sustainable Development for the second time in 2015 and for International Trade in 2016.

The company has always been a pioneer of innovation when it comes to a sustainable understanding of textiles and has been producing recycled fabrics for 20 years, as well as a number of ranges using natural wool and bast fibres, such as nettle, hemp and flax.

An industry leader in transport fabrics, Camira offers wire woven fabric construction capabilities as well as the more usual face to face plush moquette. Wire woven provides a signature loop-pile and cut-pile to create a more textured upholstery moquette, as seen on TfL's London Underground and Overground which Camira is famous for.

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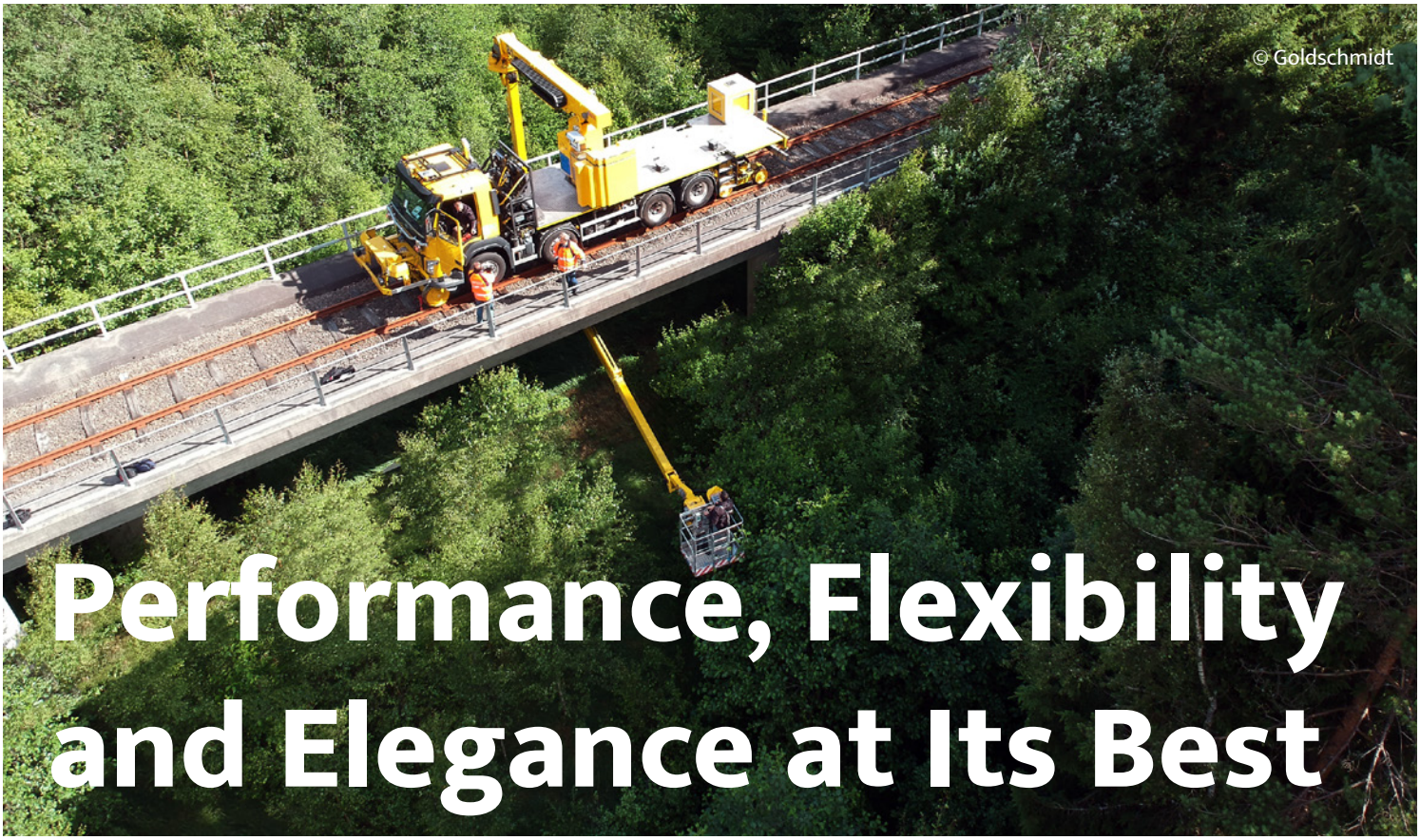


Performance, Flexibility and Elegance at Its Best

The Goldschmidt BRB 32B – A New Generation of Road-Rail Inspection Vehicle

In Italy, RFI operates and maintains the public railway infrastructure. The maintenance of railway bridges, as part of the infrastructure, is particularly important and this also requires inspecting these bridges. Railway bridges can be classified based on the following factors:

- the crossing level of the railway line (under bridge or over bridge)
- the type of superstructure (arch bridge, truss bridge, cable-stayed bridge or suspension bridge)
- the type of material used for the construction (masonry bridge, steel bridge, RCC bridge, prestressed concrete bridge)

In RFI's maintenance plan, a professional inspection is required to ensure the safety and permanent usability of these structures in order to operate trains according to schedule.

There are 20,000 RFI railway bridges of all kinds and around 40 percent of the total are arch bridges. The different designs naturally have material-specific properties, which must be considered during the inspection made by the RFI specialists.

RFI personnel make on-site visits to bridges as specified by UIC code 778. Scheduled visits and visits at short notice are provided for as required and are now carried out in different ways, e.g. by AWP (Aerial Work Platform), or on foot etc. to ensure that the operator is at "contact distance" from the structure being inspected.

Requirements for the Maintenance of Italian Railway Bridges

In recent years the requirements to maintain and inspect bridges have reached a high level of intensity and accuracy in order to ensure the proper operation and safety of the railways.

It became obvious that RFI must find answers to the increased demands to ensure their fulfilment. A solution was needed.

The requirements are as follows:

- track access for inspections has been reduced, because more trains are in operation and headways are higher – this needs to be handled properly
- rail service downtimes caused by inspection activities should be avoided or limited
- higher inspection productivity is required to align and synchronize activities in general, and for the inspection of railway bridges this includes:
  - » processing double track lines in one step, allowing the inspection platform to wrap around the parallel track (i.e. the one the road-rail vehicle is not on) underneath the bridge to enable full inspection without transferring the inspection vehicle from one track to the other track
  - » keeping the parallel track in operation when the track on which the road-rail vehicle is placed is blocked for train traffic

The Goldschmidt BRB 32B

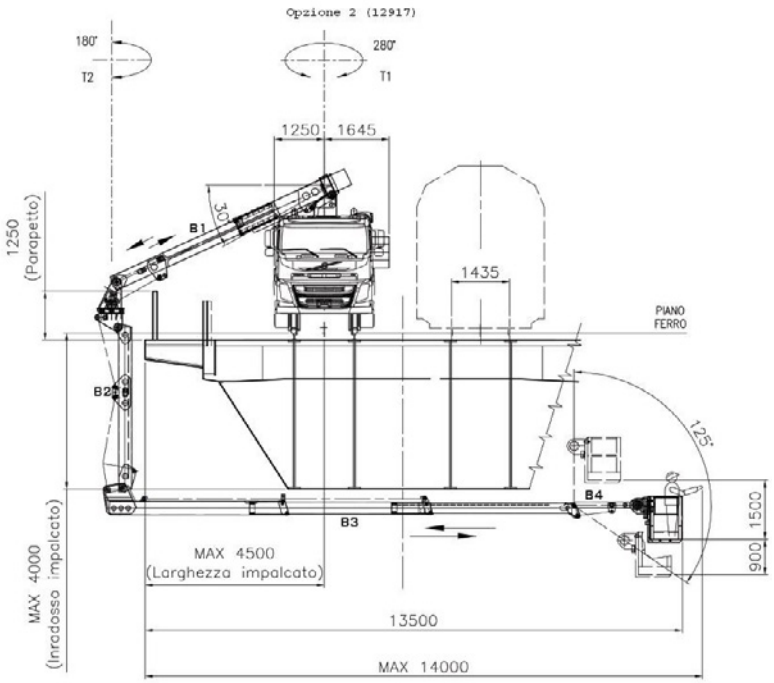
The Goldschmidt Group is a global solution provider in the railway business. The Goldschmidt companies SRS (Sweden) and Thermit Italiana (Italy) are very well-known as reliable business partners, providing innovative products and smart rail solutions to their customers.

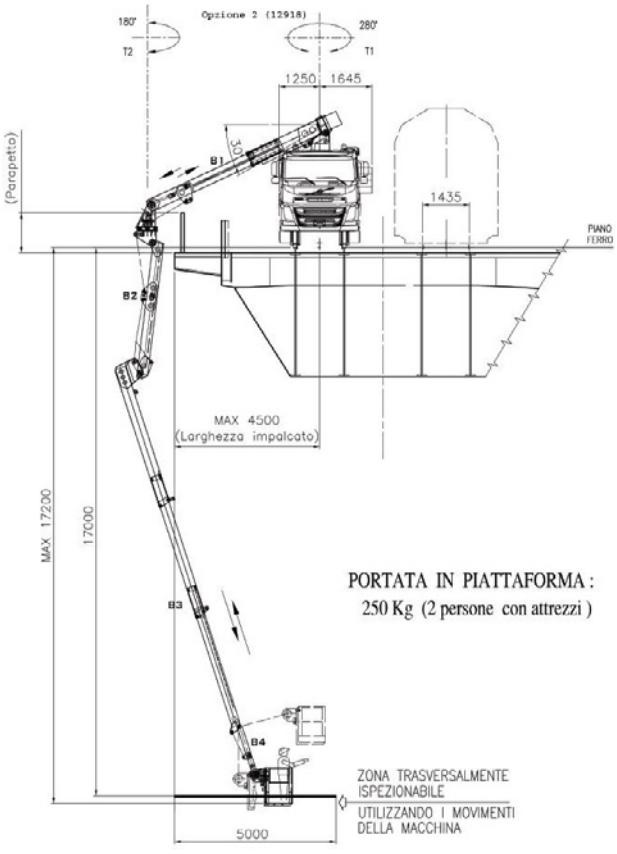
In 2018, RFI approached potential suppliers in Europe with their request to improve the inspection of railway bridges. In the end, RFI were convinced by Goldschmidt's offer. Their innovative products in the segment of road-rail bridge inspection vehicles were able to fulfil the high-end requirements from RFI and even more.

SRS and Thermit Italiana established a partnership with the Italian partner Barin S.r.l., market leader in the manufacture of telescopic booms. This cooperation resulted in the development of a new generation of technologically advanced road-rail bridge inspection vehicles in a short time which meet the technical specifications of RFI.

In Q3 of 2019, the first vehicle was delivered to RFI. In Q4, the RFI staff were trained. After the successful validation and acceptance, the road-rail vehicle entered service.

The Goldschmidt BRB 32B fulfils the state-of-the-art technical requirements to maintain and inspect railway bridges in the best way possible.





Diagrams: performance of the inspection platform © Goldschmidt

The key performance elements of this vehicle are:

- The inspection platform combination reaches downwards 17m, upwards 10m and in the lateral direction 14m. It can wrap around the bridge and turn 280 degrees with the main turret (T1) for a bridge wrap-around inspection.
- The specially developed safety control system guarantees the inspection work under a deenergised overhead catenary without tearing it. Trains on the parallel track can operate during the inspection.
- The special tilting platform is characterised by the continuous measurement of its inclination. When high values are reached, which can endanger the safety of the operators in the basket, self-levelling is activated, and the basket is brought back to level. Moreover, it is possible to control the movement of the entire vehicle directly from the basket, in order to make short precision movements at low speed (3km/h), but always with the consent of the SIFA (consensus) pedal placed in the front cabin.
- No side supporting legs are required to stabilize the vehicle, another aspect which allows continuous inspection.
- Due to its axle weight of less than 16 tonnes, the vehicle can run on all Italian railway lines.
- The vehicle is approved for driving on the road up to 90km/h, which enables a quick transfer to the designated railway track access point.
- The SRS patented hydrostatic propulsion-driven boogie in combination with the rear cabin allows reverse driving at 60km/h on rail track.
- The vehicle can be controlled on the track from the front and rear cabin but also from the basket.
- The two-minute solution to go on or off track efficiently limits the track possession of the vehicle and minimises interference to train operation.
- The telemetry system allows remote status control by the manufacturer.

Smart Rail Solutions for the Success of Our Customers

The high technological standard of the product allows RFI to greatly increase the effectiveness and efficiency of inspections on railway bridges. The system reduces the time it takes for operators to reach the bridge and enables inspections on both sides of the bridge while remaining on the same track.

The success of this project was connected to the close collaboration between the parties. This included SRS with its technical expertise based on long-term experience of all kinds of road-rail vehicles, Thermit Italiana with its understanding of the Italian market, and Barin with its high-performance telescopic arm. All this, including the excellent co-operation between Goldschmidt and RFI, has made it possible to develop the product successfully.

Six more vehicles will be delivered to RFI in the course of the year.

www.goldschmidt.com

Franchising Is Dead

A Conversation with Gareth Dennis

In March 2020 the UK Government suspended rail franchise agreements, instead putting in place Emergency Measures Agreements (EMAs), paying franchisees a 2 percent management fee to run trains, due to a collapse in passenger numbers as a result of the coronavirus pandemic. These EMAs due to expire for the majority of TOCs on 20 September 2020.

Railway engineer Gareth Dennis is a lecturer at the Birmingham Centre for Rail Research and Education (BCRRE) leads the York branch of the Permanent Way Institution. He believes franchising was always a bad idea and this current crisis is the nail in its coffin.

Our editor-in-chief, Josephine Cordero Sapién, spoke with him to find out what should come next, in a conversation that paints a broad picture of the structural problems with the British rail network. Abolishing franchising is merely the first step in what should be a comprehensive overhaul to the railways to increase capacity, drive modal shift and address the mega-trend, which is climate change.

Josephine Cordero Sapién: Franchising – it's not just been a problem during lockdown. You've not liked it from beforehand. Could you say a little bit about what your gripes with it are?

Gareth Dennis: There are a range of different problems that I have with franchising. Key among them is that nobody can tell me what franchising is for when it comes to the railways. The railways are not just a geographic monopoly but also a highly complex system that's totally interdependent on a load of factors that the franchisee is never going to have control over. I can never understand why franchising was chosen over a concession model. The idea was that franchisees could drive growth. But the reality is that franchises were let with the idea that the railways were going to be managed decline. A couple of franchises were let on a not-for-growth basis. So number one issue

"Nobody can tell me what franchising is for when it comes to railways."

is, they didn't really know what they were for.

Second issue with that is, on a system that is so interconnected, so complicated, they didn't have the ability to do anything particularly radical. There's only really one example of a successful franchise, when it comes to growth and driving new passenger growth and also a collaboration with the infrastructure manager to create new services and that's Chiltern Railways. And the reason why that works is because Chiltern Railways almost has its own little segregated network that it runs on.

It was being run almost as a concession. All the other franchises are much more complicated. They're interacting with different networks being used heavily by different operators.

The other challenge is risk management. Government has been pushing more risk on to franchise holders to the point where none of them are particularly interested. And as the railways got busier, the only area really where profits could be derived for the franchise holder was in staffing, so drivers and guards. As a result of that squeeze we've seen a lot more industrial action. In quite a few of the cases the franchisees went to reduce the number of drivers required, muck around with the contract for guards, and for better or worse that's resulted in degraded industrial relationships. All these combined factors come together to illustrate the fact that franchising just wasn't a good system to start with because it has no real objectives and purpose. Franchising fragmented the industry far too much, without an idea for a reorganisation for growth.

"Government has been pushing more risk on to franchise holders to the point where none of them are particularly interested."

JCS: Under British Rail it was structurally much more like the model you've actually proposed before, where you have an intercity network and then you have regional operators that do the commuter and near-distance services.

GD: The challenge with the railways being absolutely at capacity is that there is no ability for any kind of commercial cleverness when it comes to running trains. The different franchises are screaming out to run as many services as they can and they can't run any more because the infrastructure is full and that's totally out of their control. One of the challenges with franchising is that actually you have far more centralised control than the railways have been under, potentially ever. That level of control means that there is very little regional accountability or regional knowledge. So, an understanding of what services people wanted. The franchises started out as quite thin documents but in the last five years these documents for the bids were huge!

JCS: They're about 800 pages long!

GD: Yes, boxes worth of binders. It's insane. A franchise is supposed to be a business model that is quite free to allow a commercial edge. It's supposed to allow commercial innovation. And putting aside the fact that commercial innovation is a bit of a silly idea on the railways, because innovation is very constrained in a system where safety is so important and capacity is so constrained. These two key things mean innovation is not stifled but it doesn't happen in quite the way that it does perhaps in the open business market. With railways you've got complicated signalling, you've got rolling stock that's very expensive, takes a long time to build and procure, and all these variables, the DfT, centralised in government, was controlling and so even under British Rail you had more regional control, you had more input from the regions and that has been undermined over the last 25–30 years.

"There is very little regional accountability or regional knowledge."

My model that I talked about was really about taking a lot of the day-to-day running away from the Department for Transport and giving it to the regions, giving it to the sub-national transport bodies whether those are regional bodies like Transport for the North at city/urban level, or Transport for the West Midlands.

JCS: On a concessions-based model – there are two questions really: what will happen next? And do you think that what will happen next is also what should happen next?

GD: For fear of going 'no, of course they won't do the right thing, this is Britain and we just don't know anything about public transport', no that's not going to be my answer. To answer the first question, what I think will happen next is that we're going to have concession models and they're probably going to map broadly on to the franchise map so the franchises will transfer into being concessions, sort of as they have. That's happened.

JCS: Yes, so just extending the EMAs, because they're running out in September.

GD: In terms of the immediate future I think they're going to be extended. I don't think Government's going to want to go through the process of bidding. Given that we've also got a catastrophic Brexit inbound, I don't think the civil service is going to have enough time on its hands. So I think we'll just see a transfer of a direct-award concession. If not, you might see an expansion of operator of last resort, so similar to what's running LNER. But in the medium-term I think we're just going to see franchising not re-surface. It's gone. I think there's an acknowledgement that it isn't working.

JCS: The original competition element hasn't worked either, because the franchises were meant to be much shorter, about three years or so and train operating companies didn't really think that was great so you don't have one of the stated goals of franchising.

GD: Franchising was broken to start with. They were never going to fix the issues with the fact that we haven't built any new infrastructure on any great scale, despite the fact that we've got triple the number of passengers travelling.

To turn to whether the right thing will happen, funnily enough I think Government is being left with less and less choice about doing the wrong thing because they're running out of bad options to do when it comes to how to run the railways. It's probably going to be a concession model, we're going to see more parity between the boundaries of infrastructure manager and train operator, which is only a good thing. But I think because of the very nature of the environment that we're in now, we need to grow rail ridership very quickly, we're going to have to look at fare changes, reductions in fares to drive growth again, and I think the only way you can get that kind of responsiveness is through a concession where Government – local, regional, or probably Westminster Government – can pull the strings very quickly to change and manage fares to deal with demand.

JCS: At the moment is that people are more spooked about taking public transport. I worry that even though from a climate emergency perspective we absolutely need to shift people on to the railways and away from their cars, people currently feel more comfortable driving because you're in your own little self-contained bubble. Getting passenger numbers back up again is a challenge.

GD: It's a major challenge. And we just have to look to our friends and colleagues in mainland Europe, who have been reducing fares massively, who have been using the opportunity of people's reduced travelling to make massive shifts to domestic flights for example. The urgency is there, and the mega-trend remains climate change. That's the key driver for transport in general and we can't lose sight of that.

JCS: When I talk with anyone who is against HS2, the cynicism around it is that Government's not going to push modal shift to reduce overall passenger numbers. They're supporting all types of transport and therefore, if some people take the train the roads are clearer, I can still take the plane, I can still do all of those things, I've just added to transport demand, rather than cutting it down.
GD: The previous transport secretary, when he was asked about modal shift...

JCS: Grayling?

GD: Grayling, yes, when he was asked about modal shift, he said 'that's not the business of the Department for Transport', which is mind-blowing because modal shift to my eyes very much is.

The trouble is, there's always pressure from Treasury because Treasury sees Vehicle Excise Duty, what people often call 'road tax', as a major source of revenue at the moment, but it isn't for long. As the number of electric cars shoots up that pay zero Vehicle Excise Duty, Treasury is going to get very unhappy and they're going to have to introduce road pricing, which totally changes the equation. If you fast-forward to Shapps, he did talk positively about modal shift, so I think there has been a bit of a change. I think that there is an understanding that there is an increasing importance for us to move people and things away from more polluting modes, and that's been a fairly quick change. I

think there's cause for very light, if not optimism then for a raised eyebrow with a slight curling of the mouth at the potential that Government is slightly shifting its position on modal shift. Because the Department for Transport's key responsibility should be driving modal shift away from roads.

And this is a key thing that's a benefit of the concession model – London Overground is a concession. TfL hold the reins, TfL are a very well-informed client, they understand their region very well or the city, Greater London, they understand it very well and they work to drive modal shift. By loosening the DfT and national control over the railways, actually we have the potential to tighten control regionally, which is a good thing because regionally we have a much better chance of driving modal shift than we do nationally because regionally there is an understanding of where people travel, what's important to local people and businesses in terms of freight as well of course.

The DfT have a huge amount of control and very little understanding of the needs of the passenger. When it comes to can you run a clockface service between here and here and that requires some level of input from the DfT, they don't want to know, they're not interested.

The Department for Transport haven't invested the right money in infrastructure, so franchising was always doomed because the intransigence of central government's ability to invest.

The trains, track and also who's running the trains and putting staff on them – these are totally disconnected with different periods of return. The fact that they all need to be working together but they have totally different individual commercial drivers was never going to work.

JCS: ETCS signalling for example is a Network Rail issue but obviously it has huge implications for train operating companies as to how punctual their services can be because how quickly drivers can respond in poor weather conditions.

GD: Yes, there are key examples like that, you'll find key disconnects between those three key areas – infrastructure, train, and then operator. In several instances you'll find there are incentives against collaboration. You need to do a huge amount of staff training for this new signalling system, but under the franchise system what incentive was there for a franchise to do that?

JCS: And that has to take place during the weekday, not at the weekends because of reduced labour relations and then you haven't go the drivers to run the other services and then passengers are unhappy, and then the Department for Transport says, you're doing a rubbish job, we're going to take the franchise away from you...

GD: Exactly, and it's just this feedback loop of disruption, but then when the train operators came up with a good idea it was stymied by one of those interfaces as well. For example, Northern, in the run-up to getting gobbled up, but even when it was still a franchise, they were looking at doing this thing called digital train, where you retrofit things like passenger counters, various diagnostics, a huge amount of wiring, new wifi as well, on the existing fleet. The train operating company paid for it and did all the design work, but the rolling stock operating company said, okay, you can fit that to my 25-year-old Class 150 diesel train but as soon as I get that train back, you have to strip it all out.

> "The main benefit of the concession over the franchise is that Government has to take responsibility."

How does that make any sense? There are lots of those. Those interfaces, the breakdown, the gaps between those organisations are a real issue. And franchising built on the worst of those gaps, it created new gaps and then it also threw in all the worst of centralised control as well.

JCS: So under a concession model, because of course there are a few examples already – you mentioned the London Overground, the problems that currently exist with franchising – to what extent are those same problems going to persist?

GD: Well the key one is that you stop – for me it essentially means Government has to take responsibility. The main benefit of the concession over the franchise is that Government has to take responsibility.

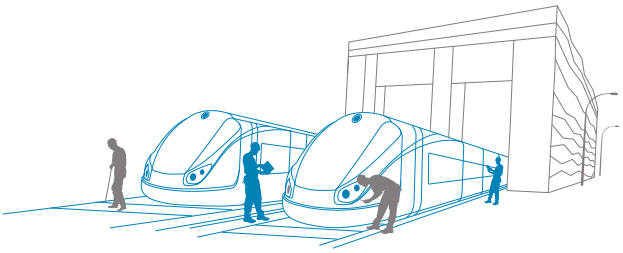
Continues on p.37...

PaxLife edge-based cloud platform **railSTACK** for rail and public transit, enables your own team to rapidly develop and efficiently run the applications ***you*** need.

PaxLife Innovations has developed **railSTACK**, a cloud edge hosting platform to create, deploy, manage any application to run on rail, buses or trams. It enables a simple and very efficient integration, at a single point onboard a vehicle, of new services for an improved passenger experience or for optimizing operator's maintenance cost and operational strategy.

railSTACK architecture empowers system integrators, transport operators and application providers to rapidly expand capabilities and continually improve new models or applications across any systems and within any vehicle saving a tremendous amount of time, cost and effort.

AI based predictive maintenance models developed in an agile fashion, video surveillance systems upgraded in a few weeks, or infotainment solutions enhanced with scalability. With **railSTACK** it now feels like deploying an app to a smartphone.



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paxlife INNOVATIONS

Interview

Ralf Cabos, Founder and CEO of the Potsdam-based start-up PaxLife Innovations, explains in a one-to-one discussion how a cloud to edge open software architecture is a game-changer for the implementation of smart rail and enhanced passenger experience.

railSTACK Cloud Edge Open Platform: An Accelerator Shot for Smart Rail and Future Passenger Experience

Q: Your background is in aerospace, where you have worked successfully for almost three decades. How does that shape your perspective of the railway industry?

Ralf Cabos: Aerospace systems have seen industry-wide standardisation of system architectures from the beginnings of 'digital'. There is also a well-defined, and internationally recognised approach to achieve certification (=homologation) for independent system upgrades ('STC'). This has supported an affordable mid-life upgrade of functionality in particular for safety-related functions.

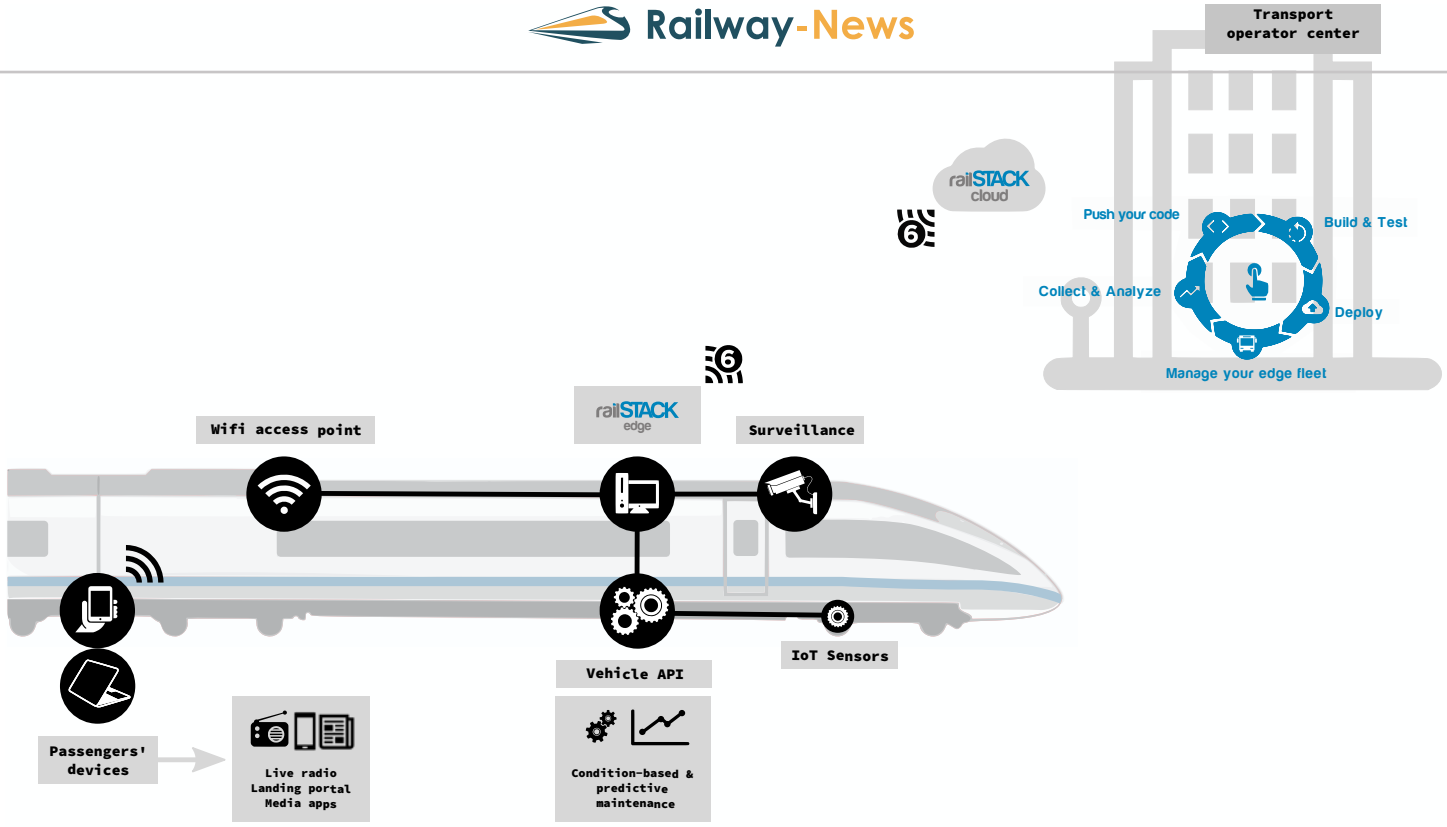
On the other hand, the typical life expectancy of an aircraft is probably only half that of a rail vehicle. Similarly to the aerospace industry a few years back, we can now see a tremendous dynamism in the rail and public transport industry driving digitisation. This is driven by passengers who expect to enjoy a digital journey comparable to what they could expect at home or in the context of other services. In parallel, operators, integrators and manufacturers are looking for solutions providing greater efficiency in operations as well as in maintenance.

Q: What are the biggest challenges that need to be addressed in your view, and how should they be addressed to fulfil these expectations?

RC: Industry trends require increasing levels of systems integration. But we must not forget that this needs to remain affordable. A rail vehicle will typically see several digital systems upgrades during its life. Modern digital architectures are mostly driven by software. However, as an example, a typical infotainment system will still be implemented in difficult-to-maintain firmware that is specific to the original system vendor.

In order to make a real difference, infotainment, maintenance-systems etc. need to be fleet or network-specific, and not dependent on vehicle make or mode of transport.

First of all, the process of integrating and deploying new



services onboard the vehicle has to evolve in a simpler, more unified and more efficient way. A basic, brand-new infotainment system could be developed and deployed by a single programmer within a month. Why does it take so long today? Today's systems are still mostly isolated from each other, specific to hardware equipment and quite difficult to upgrade or update. Upgrading system functionality will normally result in a significant capital investment.

PaxLife believes that deploying and upgrading systems onboard should be as easy as installing an application on your smartphone.

If we leave aside safety-relevant functionality, we believe that an operator should have the ability to assign any vendor they prefer, or leverage their own teams, to enhance and extend functionality that is passenger-focused, or that supports the business integration into an operators' financial controlling process.

In fact, for this type of functionality there is simply no good reason why you would require a specific make or version of computer hardware. In this context, it is just a matter of computing resources- and if an upgrade is required, then this should come from the most affordable source. It is with this idea in mind that PaxLife railSTACK architecture has been designed.

The hosting capability of our railSTACK platform enables the support and the integration, at a single point in the vehicle (the edge), of multiple applications that can come from various domains, providing a better experience to passengers or improved services to operators. You can host the entertainment apps passengers love onboard, host your TV station media library, add any dynamic internet-based service to infotainment displays, offload bulk data via WiFi or free up more

WiFi bandwidth for passenger use. Applications can be provided by any independent third party or developed in-house.

Furthermore, the regular synchronisation between the cloud and the edge part of railSTACK enables the easy update of in-vehicle services, or their upgrade with new functionalities. You could imagine enhancing infotainment displays in buses or subways with digital services. On our side, we are currently evaluating with a partner the amelioration of video surveillance systems with AI capabilities.

Probably the best part is that it doesn't require a major capital expenditure on your part. While we are happy to prove the capability as part of turnkey projects, we are also happy to make the full-blown platform available as an affordable Platform-as-a-Service (PaaS) leaving the full control over upgrades, and the benefit of rapid system implementation to our customers and partners.

Once this architecture is in place in a vehicle – a train, bus or tram – this is the perfect framework for the easy and efficient expansion of future capabilities, to roll out new functionalities when they are needed, making tremendous cost, time and effort savings compared to how projects are currently being implemented.

Q: You mentioned a better experience for passengers but also improving services for transport operators. In which area do you see the most important benefits?

RC: railSTACK brings together a cloud edge architecture and a software development paradigm. This powerful combination enables transport operators, vehicle manufacturers and engineering experts to develop, test, validate and continuously improve the new models or applications they need very easily.

In my opinion this is a key capability of our railSTACK cloud edge platform: empowering engineering services to develop their own solutions that can iteratively mature. Often it is not the first version of a solution that brings the financial benefit – it might be more important to continue to improve, learn from initial results, innovate and expand the solution.

Following the discussion we had in the industry, I believe that condition-based/predictive maintenance is the area in which I see the most pronounced benefit our platform can produce.
For this reason, PaxLife Innovations has partnered with a team of railway and aerospace engineers to initiate the development of predictive maintenance models leveraging AI capability. The project goal is to bring savings in maintenance costs and a reduction in unplanned downtimes. The starting point is to use the data the existing systems provide, and to make best use of existing sensors, where sufficient. It is key to measure success in terms of financial controlling data. The railSTACK platform is the framework enabling the development, the iteration, the update and the deployment of the predictive AI-based maintenance algorithms in operating conditions. This collaboration is being launched as part of a joint project with a railway operator and a vehicle manufacturer.

PaxLife in a Nutshell

PaxLife Innovations GmbH originally started to connect aircraft passengers to the digital world. Based in Potsdam, Germany, PaxLife Innovations now brings its cutting-edge technology to rail and public transport.

Check what we do www.paxlife.aero

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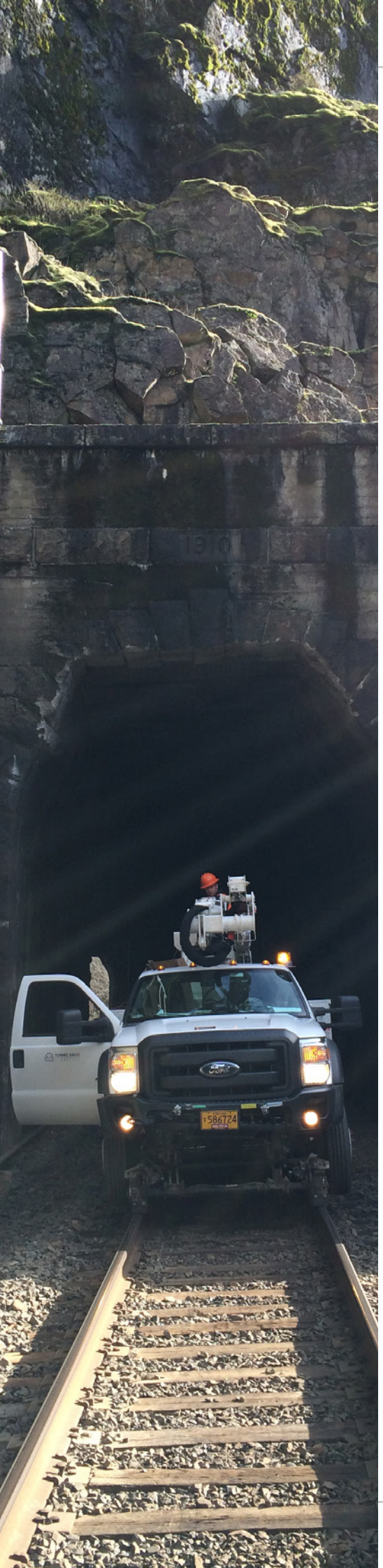


RF Challenges

Wireless communication is a reliable platform for safe and efficient train operation... until the train goes underground.

The wireless communications landscape is fraught with RF challenges. Safe and reliable technology solutions entail more than just an antenna and a wireless communication device. This is especially true in today's world of rail transportation. As trains become longer and faster, better data and voice communication become ever more important for safety and efficiency.

Development of railway RF system components, including radios, base stations and antennas has made great strides in the past decade. Implementation of these advances has allowed trains to continue and improve their mission-critical communications.

Yet RF-challenging environments such mountain ranges, canyons, forests and tunnels still present serious challenges to railway operators worldwide. No matter how high-tech the train radio is, it is 'just a brick' if it cannot actually connect to the wayside. Whether on a passenger or freight train, the challenge remains to find solutions that provide effective and reliable communications, no matter the location.

Tunnels Are Natural Obstacles for Clear Wireless Communications

When a train enters a tunnel, the best way to provide continuous communication coverage offers many misconceptions. Simply filling the tunnel with access points and radio signal repeaters won't ensure reliability, and it certainly isn't an efficient or cost-effective way to extend connectivity. Leaky feeder-based systems have proven themselves as a robust and reliable option. When combined with digital technology, leaky feeder systems provide a fluid and continuous communication connection between the train and ground.

Tunnels Aren't the Only Obstacles

Going underground isn't the only source of problems with wireless connectivity. The increasing length of trains creates connectivity issues. Dual-power communications enable HOT-EOT connectivity, ensuring safety and improving locomotive efficiency. Additionally, dense foliage abutting the right-of-way and tight turns on narrow canyon passes can cause low to zero propagation areas. In locations ranging from the heavy vegetation of the Brazilian jungle to the steep canyons of the Tehachapi mountain range in California, extending RF-based coverage is a necessity.

Leveraging a Modular Leaky Feeder Foundation for Other Critical Functionalities Is Key

A modular and reliable communication system is a key building block for future-proofing the system. Modularity gives the railway operator the option of leveraging their existing installation toward later needs. For instance, personnel proximity and location tracking can be installed as an overlay to a comms-only system. Back office monitoring systems that provide real-time alerts about equipment location and maintenance crews allow the railway operator to identify potential conflicts between operating trains and active work zones. The possibilities are only as limited as the problems needing solutions.

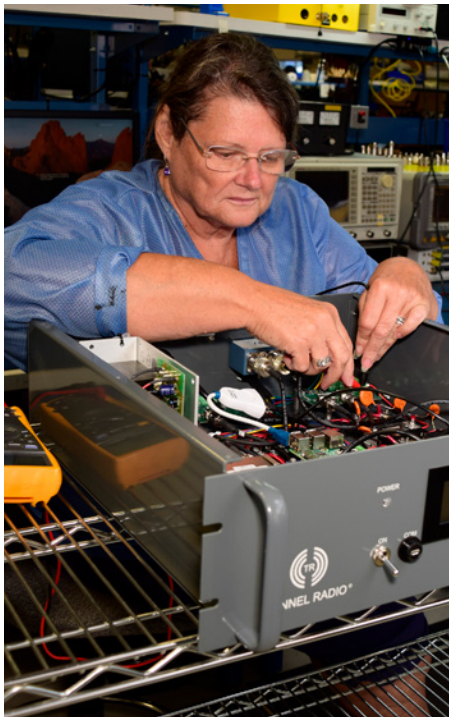
High reliability and connectivity do not always mean high cost. While difficult challenges create a need for adaptive and comprehensive solutions, new or cutting-edge technology isn't always the only – or best – answer. Proven and established technologies often provide a better approach. They offer a track record of known reliability and availability, which leads to reduced costs, upfront and long-term.

Enter leaky feeder technology. The basic technology of a leaky feeder system has been around for decades. By combining it with digital data and voice radios, railways can reduce the cost of implementation and maintenance. Today's leaky feeder technology also offers modularity options that expand its reach even further. The result: lower budget requirements for new installations, and smaller maintenance costs for existing installations due to longer maintenance cycles and fewer deployed devices per kilometre compared to other technologies.

The Tunnel Link™ system employs a distributed antenna system, consisting of radiating coaxial cable and digital amplifiers that provide signal extension. Tunnel Link's unique design handles high-speed asynchronous data in simplex mode at very low distortion figures, suitable for use with FSK or phase shift complex modulation schemes used in today's modern digital communications. This design also negates any need for multiplex equipment. The amplifiers are ruggedised, and component count is low. The built-in diagnostic and monitoring system allows local and remote use.

Planning for the Future When Buying Today

Designing systems that are adaptable to future technology requirements is one way to ensure usability for the long term. Well-designed RF systems are



integrative and interoperable now and in the future. Conforming to EN, FRA, IEEE, IRIS and other recognised conformity specifications adds insurance that products will be safe for end users.

Technology without Customer Support Is Like a Building without a Foundation

Finally, having qualified technical support available 24 hours a day, 7 days a week is the keystone to a successful RF-challenged remediation. Many OEMs and suppliers forget that railway operators do not have time for scripted call centres with 9–5 hours. Immediate-need customer support via voice, video and email, minimises downtime for railway operators, thus reducing negative cost impacts and operational delays.

TUNNEL RADIO

Meeting Underground RF Challenges

Connecting trains and comm systems in tunnels, underground, and other RF problem areas

- Train control connectivity for North American PTC, ETCS, TETRA, Distributed Power
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- Radio/dispatch communication systems

TUNNEL RADIO

tunnelradio.com

Corvallis, Oregon, USA

Franchising Is Dead Continued...

With the May 2018 timetable meltdown Government just tried to find everyone to blame. It was blaming train operators left, right and centre. Where actually it was pretty much entirely Government's fault that that happened. For me, the main benefit of the concession model is that Government cannot hide behind the fake idea that there is a franchise that makes its own autonomous decisions.

JCS: The idea is, they have an incentive to be better, because they become accountable to the public.

GD: Exactly. That is the key thing. For me, the concession model is accountability.

JCS: But then ideally you'd also want to have not necessarily the Department for Transport in charge.

GD: By nature you don't have the local or regional interest at the DfT – you're looking at things at a national level. The DfT should be in the business of looking at the big figures like driving modal shift, how quickly do we want to decarbonise – these are the big-hitter bullet-point things the DfT should be responsible for.

But they should not be responsible for deciding how many trains run between Adderley Park and Birmingham New Street. The reality is that the best place for that control is at either regional or local level.

JCS: Yes, Westminster doesn't control when my bins get picked up and it would ludicrous if they did. It's the same kind of thing.

GD: Exactly. And this comes from the fact that this really stems to a deep ideological point about that the railways are a public service.

JCS: Which is what we've realised during this pandemic. Government realised we must keep them running.

GD: It's what we've realised several times! Yes, we've realised it successively over various crises over the last 25 years or longer. When there's a national railways crisis for whatever reason, timetable meltdown, Hatfield rail disaster, meaning everything has to run slowly – the country grinds to a halt. GDP falters, all these different measures. Look at the strikes on Southern. How many people's lives were horrendously and irreparably affected by the strikes and the not being able to get to their places of work and not being able to afford an alternative like living closer to London. The railways are a public service and because of that they need to have regional and local control. You need to have people in the right places who understand the needs of the local area.

JCS: So if we now move to concessions and the Department for Transport is the one to point the finger at, they might actually be motivated to have regional bodies so that they have an extra layer of deniability for themselves. Is that cynical?

GD: It's a difficult one. In an ideal world they start feeling the heat a little bit and so they want to push that heat out. But then you've got to think about the fact that certainly when it comes to the urban areas, largely the control is Labour. Okay, Andy Street is in charge of the West Midlands. But for the most part regional and urban government generally finds itself being more left-of-centre. The fear is that you end up with – this is partly why there's such a battle between TfL, between the mayoral office in London, and central government. When they're on opposite sides, certainly when the government is Conservative, you'll find that local / regional government typically flips the other way and so they don't want to give that control to the other side. There needs to be the right interaction between the regional transport body and the urban body and the conflict in the way those work is something that needs to be understood. There's maybe not an easy answer as to how that works but the important thing on the railways is that, to quote Roger Ford from Modern Railways magazine, it's about structure, not ownership. The nationalisation versus privatisation discussion is really a bit of a distraction and a side-show. And certainly under franchising the structure was not right.

> "One of the main challenges with the concession model is that it doesn't work unless you buy up the rolling stock."

One of the main challenges with the concession model is that it doesn't work unless you buy up the rolling stock. It's an improvement on franchising inasmuch that franchising couldn't have existed as it is, but until the concession has its own rolling stock, dedicated, that it can decide to buy new stock or it can upgrade existing rolling stock, it can do things to its own stock and it knows that that stock is going to be running on those tracks as long as the stock is functioning or perhaps until that stock gets cascaded elsewhere but until that's the case, that structure is not right yet.

JCS: So if they're extended now – the concessions – the next thing you're saying should happen is Government should over time buy back the rolling stock from the ROSCOs?

GD: Yes, so certainly there should be a moratorium on any new rolling stock being procured through a rolling stock operating company. It just adds cost. It's not the TOCs or because the manufacturers are over-charging, it's because the rolling stock operating companies exist and the leasing model that they use to buy new rolling stock

JCS: So do we think 18 months is going to be the next extension length for the time-being or are they going to go for something longer right off the bat?

GD: Yes, that's a very good question. My instinct would be round about an 18-month or maybe 24-month direct award to transition finally off these emergency measures to a concession model.

JCS: At the same 2 percent for train operating companies?

GD: Yes, probably pretty much the same.

JCS: Because the worry is that they'll say, 'I'm not going to do it', if Government offers less.

GD: Yes, it's true – I used to think franchising was the worst of all worlds but actually currently it's not great because Government really is beholden to these private operators. There are serious advantages to not having private operators involved because a company can't just turn around and say, 'okay, we're not going to run the trains then'.

JCS: Which is the same as with franchising initially, where they were to be let on a three-year term to keep competition constantly going so that we have good services, and the potential franchisees said, 'well, that's not of interest to us' and so they had to lengthen and lengthen and lengthen them.

GD: Going into the railways to turn a profit isn't a good idea. It's a public service, actually we should be looking at maximising the things that are good about the railways' role, which is moving more people, moving more things more efficiently, reducing greenhouse gas emissions overall, those are the targets and there's going to be a collaboration between public and private to deliver that. The railways are no longer a cash cow and they haven't been for a long time. Ultimately the reason franchising is collapsed is because it doesn't make any money for the franchise holders. It's ended itself really.

JCS: Yes, it being on the way out, they're probably thinking, 'fine'.

GD: There are so many franchises that were just borderline ready to collapse, the South Western Railway franchise was just about ready to collapse, Northern had already gone of course, there were several others that were very close to just collapsing in on themselves and the reason for that was because of over-promising and not being able to deliver because Government hadn't delivered on its side of the bargain regarding infrastructure or rolling stock, but broadly because they just weren't making any money. In several cases the owning groups, Abellio or indeed Deutsche Bahn, were actually haemorrhaging money into the railways from their owning groups.

JCS: Because when they made an initial bid, circumstances changed that they couldn't foresee and they had to deliver on what they promised five years ago?

GD: Absolutely, yes. It wasn't even five years, it was only a couple of years into these franchises that LNER / Stagecoach were paying a lot of money into the coffers of Government because it had suggested it would get growth using the Virgin brand that never materialised. Because funnily enough there's only so much growth you can drive when the trains are full and you can't run any more trains. The DfT were saying, 'if you look at these potential growth numbers...' Yeah but the trains are full and you can't run any more trains, where is this growth going to come from? There is only so much air you can pump into a tyre before it bursts and the analogy here is, we need a bigger tyre. If we want to pump more air into it, you need a bigger tyre. So fundamentally franchising was just going to disintegrate.

Ultimately, people want to travel by train more cheaply and we should have a strategy and structure that allows them to do that.

ARGUS

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STRONG EQUIPMENT MANUFACTURING EXPERTISE AND CUSTOMIZED SOLUTIONS

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ASTRONICS
TEST SYSTEMS

Are you covering all of your passenger safety concerns?

A Focus on State of Good Repair for Onboard & Wayside Assets

Safety is top priority in transit systems. It is the responsibility of the government, transit authorities, vehicle and wayside system manufacturers, and major system suppliers to provide reliable, safe transportation on schedule, every trip. As we all work to make traveling safe during the COVID-19 pandemic, we must remember to focus on providing State of Good Repair (SOGR) for all of our systems.

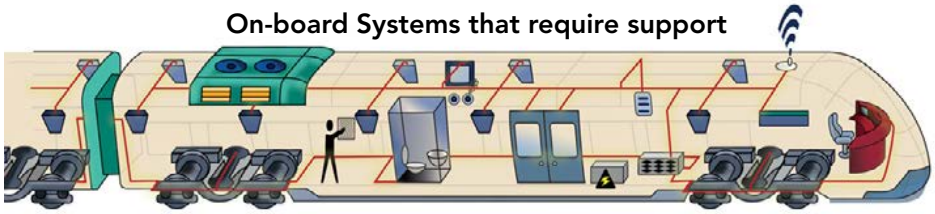
For more than 60 years, Astronics Test Systems has developed test and measurement instruments and automated test solutions that verify system performance, commission systems, and can help test, diagnose, and repair complex electronics over their lifetime. The Astronics approach and primary focus is to support and optimize performance of complex systems, including High Power, Communications and Control, Radio Frequency, and Electrical-Mechanical-Pneumatic systems, during design verification, manufacturing test, product commissioning, and over the lifetime of the product. Astronics Test Systems Senior Director of Engineering, Chuck Kohfeldt, said, "There are many challenges in developing a solution to provide a single family of support equipment for a railcar, bus, or wayside system." "Railcar and bus manufacturers typically rely on ten or more different major system suppliers for each new vehicle. Often times, these suppliers are competitors and will not share intellectual property with each other. This detailed design data is required to verify system performance. In order to control obsolescence and long term logistics costs, transit authorities are now specifying a consolidated support solution in RFPs. As test, measurement, and integration experts, the Astronics team is able to coordinate with vehicle manufacturers, major system suppliers, and transit authorities to provide a single family of consolidated support equipment to meet this requirement." Astronics has developed a commercial off the shelf (COTS) Common Core family of consolidated support equipment for meeting all of your manufacturing test, system verification, commissioning and lifetime test, and diagnostic requirements. Both portable and stationary systems are available; the former to support commissioning, maintenance of way, or on board testing and the latter to provide factory and depot or back shop support. All of the systems share common software, operator tools, and instrumentation. Each system is configured and scaled to provide "just enough" capability.

A consolidated family of test equipment provides all of the tools you need in one platform for system validation and diagnostics. All Astronics equipment adheres to standard test practices, validates consistent performance, and provides long-term support for your systems.

Consolidated Test Equipment from Astronics Test Systems helps major systems manufactures, railcar and vehicle integrators, and transit authorities assure the safety of the traveling public.

Providing this capability is no simple task. Astronics works with vehicle manufacturers and wayside systems providers using an integrated product team (IPT) approach. As stakeholders in every IPT review, Astronics engineering teams can identify and strictly adhere to standardized test requirements for every system, LRU, and LLRU. A combination of deep expertise in test and system integration along with co-located manufacturing and engineering enables Astronics to be agile and flexible throughout the development process. Innovations in design or adjustments in requirements for the variety of products involved can be implemented quickly and cost-effectively.

On-board Systems that require support



1	HVAC Systems	11	Event Recorder
2	Propulsion Systems	12	Monitoring and Diagnostics Systems
3	Master Controller	13	Radio Communications
4	Lighting Systems	14	Auxiliary Inverter & LVPS
5	Water and Sewer Systems	15	Air Compressor and Pneumatics Systems
6	Audio Systems	16	Coupler Systems
7	CCTV Systems	17	Cab and Cab Control Systems
8	Door Systems	18	Tread Brake Unit
9	Batteries	19	Trainline and Car Control
10	Customer Communications	20	Rail Gap Detector

Wayside Systems that require support

1	PTC, CBTC, ATC	8	Power Monitoring
2	Computer Based Interlocking	9	Signal Relays
3	Radio Communications	10	Energy Storage / Recovery
4	Signaling Control	11	Display and Signs
5	Gate Level Crossing Controls	12	CCTV`
6	Switch Point Controls	13	Door Systems
7	Control Room Systems	14	Customer Communications

As advanced technology insertions continue to expand in transit systems, the need to provide appropriate support has become more challenging. Astronics helps alleviate this challenge with tools to help your team ensure optimal performance, verify commission, and maintain SOGR for all of your on board and wayside assets.

Currently, Astronics is working with New York City Transit (NYCT) to provide 8,200 average weekday train trips ensuring safe, on time arrivals for 5.58 million riders on an average weekday. Astronics' Consolidated Bench Test Equipment (CBTE) and Maintenance of Way tools are a key part of NYCT's strategy for maintaining SOGR. Major system suppliers, railcar manufacturers, and transit authorities around the world partner with Astronics to provide this capability, per customer requirements.

As a member of APTA, UITP, and IEEE, Astronics works diligently to ensure standards are set to protect the traveling public. As evidenced in the House of Representatives and Departments of Transportation and Housing and Urban Development and Related Agencies Appropriations Bill 2021, the company's work with local state and federal governments has led to legislation and funding to help maintain safety for the traveling public (see excerpt at top right).

System safety and risk reduction programs *—The Committee recognizes that continued investments in critical rail infrastructure programs will make rail infrastructure, equipment, and the operating environment safer. Therefore, the Committee urges FRA to continue prioritizing investments in the development of technologies designed to verify the functional performance of complex electronic systems such as: PTC, passenger door control, railroad crossing equipment, communication systems, train and locomotive systems, train environmental control, railcar signs, infrastructure maintenance, and monitoring systems. The Committee recognizes the importance of deploying these technologies in new and existing systems and acknowledges investments made in such technologies by cities, transportation agencies, and railroads across the country. The Committee urges FRA to continue working with industry to develop standardized performance specifications, test and verification processes, and maintenance and diagnostics tools for such systems.*

Consolidated support systems from Astronicss help major systems manufactures, railcar and vehicle integrators, and transit authorities assure the safety of the traveling public and meet all of their system verification, test, diagnostic, and support needs.

Contact us now with your most difficult support issues. We have solutions that will help ensure your systems function per specifications and that you have the organic capability to repair out of spec or aging systems.

astronics.com/mass-transit-test-equipment

ASTRONICS
TEST SYSTEMS

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ATS-500
Functional Tester

FREEDOM R8100 LMR/PTC
Service Monitor

ATS-3100 PXI
Integration Platform

Maintain a state of good repair for on board and wayside assets with universal, consolidated test solutions

The efficient and reliable maintenance of electronic circuits over their long working life is critical to the safe operation of mass transit systems. Test all of your critical electronics systems with our comprehensive solutions, consolidating the work of many testers into one.

From Consolidated Automated Bench Test Equipment (CABTE) to Portable Test Equipment (PTE), leverage our 60 years of test and measurement expertise to ensure optimal performance of your critical systems and provide safe, reliable transportation for your passengers.

Learn more: astronics.com/mass-transit-test-equipment

TEST SOLUTIONS

ELEVATING performance

MTM Power's Thermoselective Vacuum Encapsulation © MTM Power® GmbH

MTM Power Keeps You on Track Even in Times of Crisis

The Current Situation of the Rail Industry as a Result of COVID-19

The global pandemic has caused society and the global economy to face challenges that have never been seen before and as such they were unforeseeable too. MTM Power® takes the present situation very seriously, giving the health and safety of our employees the highest priority. At the same time, we are doing our utmost to take into account the permanently changing requirements in our customers' needs.

Railway technology involves long-lasting capital goods. Unaffected by the corona pandemic, MTM Power is currently working on ongoing projects. Planning concepts in the rail industry is based on longer implementation periods. Many projects were already scheduled prior to the pandemic, therefore MTM Power does not expect any major effects on railway vehicles already in production. The situation is different for projects that have not yet been finally decided. Here, it can be assumed that they will be implemented with a time delay. Especially when it comes to the test phase, projects cannot be timed as planned. With this in mind, MTM Power expects a slight decline until end of the year.

On a positive note, the current delivery of components for MTM Power rail products is consistently stable. The majority of the suppliers have implemented an emergency operation to secure demand, so that MTM Power has not had any significant losses in the supply chain so far. The only downside is that, due to the corona virus national and international supply chains have become more expensive, which is reflected in the steadily increasing transport costs of components.

InnoTrans and Future Outlook

With the rescheduling of InnoTrans 2020, the railway industry has lost an important communication platform this year. For MTM Power, InnoTrans has become the most important event for its rail business. Therefore, MTM Power will definitely take part in InnoTrans 2021, which will take place in Berlin, 27–30 April 2021, to inform attendees about its latest developments and general power supply trends for sophisticated use in railway technology.

New Products: PCMDS250 DC/DC Converter Series

MTM Power is now investing this additional time in developing further series and bringing them

DC/DC converter PCMDS250 110S24 W-VT
© MTM Power® GmbH

to the market by spring 2021. The PCMDS250 series is one of the most recent developments in the DC/DC converter product range for use in railway technology.

MTM Power® GmbH has developed the new DC/DC converter series PCMDS250 for universal applications in railway and vehicle technology. The PCMDS250 series is based on a revision of the well-proven PCMD250 converter series after more than 10 years of successful market presence. The aims of the development were a further increase in efficiency and reliability and the integration of various features such as Power Good signalling and stand-by operation.

The converters with an output voltage of 24 VDC deliver an output power of 250 W. The design of the output voltage with U/I (constant voltage/constant current) characteristic allows the supply of critical loads and charging of batteries (optional Uout=27.6 VDC). Two input voltage ranges according to EN 50155 are available: 72 VDC (43.2...100.8 VDC) and 110 VDC (66...154 VDC) which allow the DC/DC converters to operate on common battery or on-board networks in Europe, in trackside applications and in stationary railway systems.

The devices have an 'Output Voltage OK' signal as a potential-free contact as well as a remote-control capability to place the converter in standby mode with the lowest power consumption. An undervoltage shutdown protects the converter as well as the application from damage during brownout effects of the supply voltage. Using a primary-related control input RC (Remote Control), they can be put into standby mode with the lowest power consumption; thus contributing to an increased availability of the supplied systems, especially during battery operation. The DC/DC converters are now connected via push-in cage clamp connectors with lever, which are designed for wire cross-sections up to 4 mm^2. Designed for an operating temperature range of -40 to + 70 °C (class TX according to EN 50155) the cooling is guaranteed either by the integrated heat sink (option WK) or by mounting the base plate on a heat dissipating surface. Due to their compact design, the converters are suitable for applications where space is limited. Furthermore, they are robust against mechanical stress such as shock and vibration.

The maintenance-free converters are vacuum potted (EP 1 987 708, U.S. Patent No. 8,821,778 B2) and offer reliable protection against condensation, conductive dust and other environmental conditions. A version with protection degree IP67 is possible upon customer request. The compact dimensions of 170 mm x 110 mm x 38 mm (length x width x height) and the high packing density create an efficient, cost-saving solution for different power supply tasks.

Resistant to both mechanical stresses, such as shock and vibration, and environmental influences such as condensation, humidity and conductive dust, the MTM Power DC/DC converter series has been designed in accordance with EN 50155 and EN 45545-2 and is suitable for sophisticated use in trains, for mounting in containers in the roof or underneath the floor, as well as in driver's cabs, engine compartments and in the wagon.

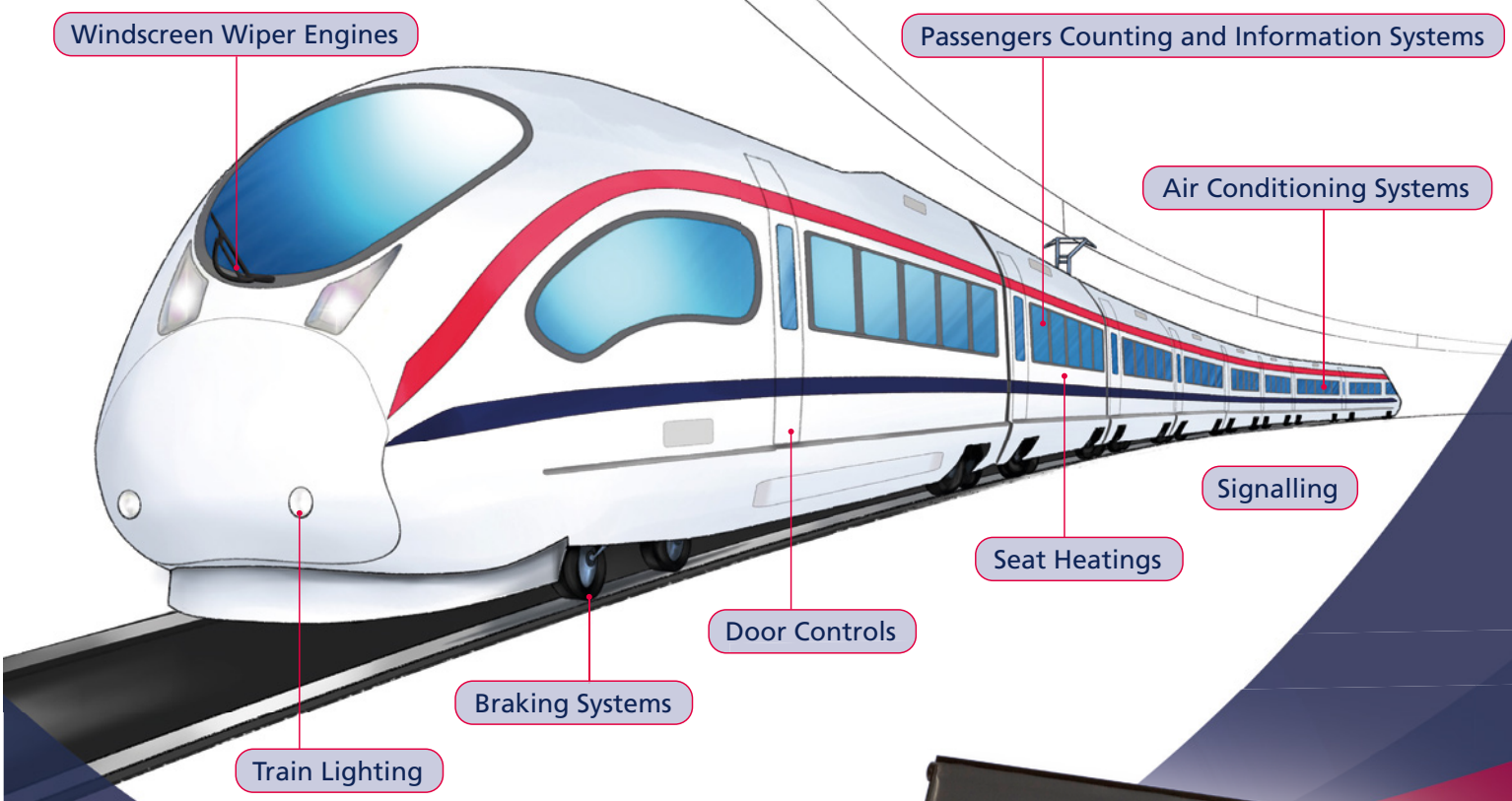
Additional MTM Power Products

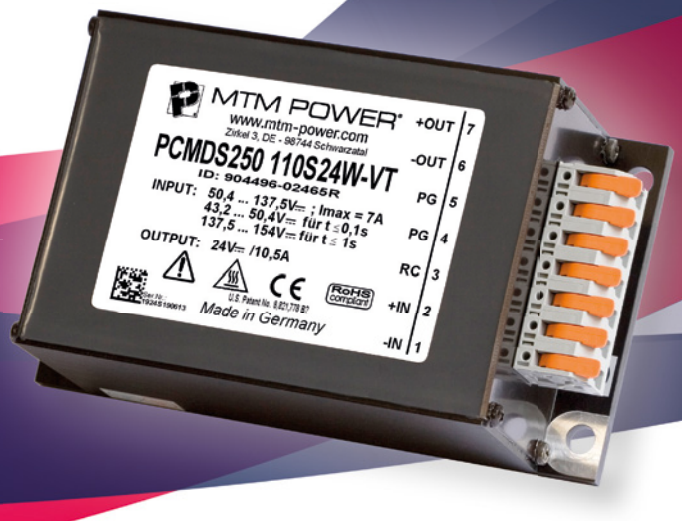
Besides these rail converters, the MTM Power product range includes transformers, filters and multi-power supply systems of up to 2 kW. At the same time, custom-made products and modifications of existing products can be realised also in relatively small volumes and in a short period of time.

All MTM Power devices are especially designed to ensure the delivery of operational requirements under rough and critical conditions. They also comply with all the requirements and standards specific to railway operations. MTM Power® provides its customers with the relevant Certificates of Conformity (CoCs) for fire protection, and short reports of the DVT (design verification test) and all railway operation products.

www.mtm-power.com

RAILWAY POWER SUPPLIES for ...





STAY ON TRACK.
WITH OUR INNOVATIONS.

New Series PCMDS with 250 W

- Output power: 400 W; Efficiency: ≥89 %
- Input voltage: 50,4...137,5 VDC
- Output voltage: 24 V
- Ambient temperature: -40...+70 °C / +85 °C 10 min
- Transient protected, vaccum encapsulated
- EN 60950-1 / EN 61000-6-4 / EN 61000-6-2
- Fire protection acc. to EN 45 545-2

www.mtm-power.com

MTM POWER®

Optimising railway response times

Delivering a reliable and efficient journey experience for passengers is key for railway operators.

By moving away from a reliance on individuals, to the use of unified control rooms, operational resources can be efficiently managed, allowing for informed decision making and precise communication flows, improving safety and service continuity.

The answer? The integrated Public Transport solution from Frequentis satisfies operational as well as safety management system requirements.

Together the Frequentis Operational Communication System and Incident Management System support efficient day to day operations as well as prompt incident resolution, providing situational awareness, faster communication and efficient workflows, all aligned with the latest railway telecommunication standards.

With Frequentis technology operators are put back in the driving seat and customer satisfaction is improved.

Wiener Linien Control Centre in Erdberg © Frequentis

Prioritising the Passenger Journey

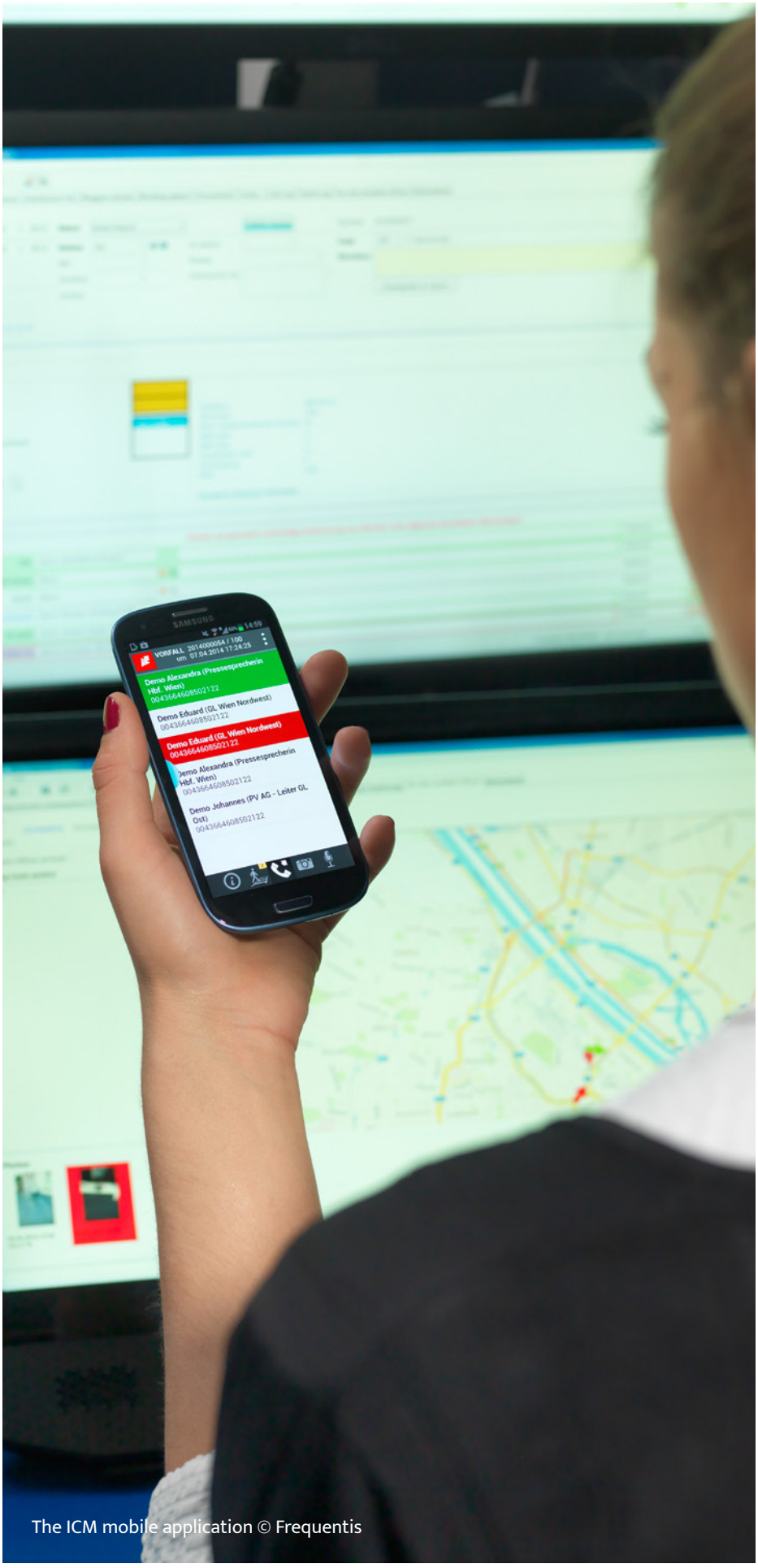
FREQUENTIS
FOR A SAFER WORLD

As railways adapt to reduced passenger numbers and new capacity limits to maintain social distancing, it is as important as ever for safety, reliability and punctuality to meet passenger expectations. Markus Myslivec, Head of Public Transport Solutions at Frequentis, explains how integrating software solutions for operations and incident management can help.

Before the pandemic there was a focus on improving the rail passenger experience, reducing overcrowding and expanding capacity at peak times. As passengers start to return to work it's clear that commuter numbers are a long way from returning to pre-Covid levels. Numbers aside, passenger journey and safety are still key; keeping passengers informed about incidents and keeping disruptions to a minimum remains a priority.

In the rail sector, Frequentis is focused on promoting a high level of integration between the software solutions needed for day-to-day operations, and those used when an incident occurs. This integration is key to the management of any incident on or around the railway and is reflected by the improved key performance indicators (KPIs).

Three of the improved KPIs are initial response time, the quality of the decision-making process, and the efficiency of communication between responders. These can make or break the performance of incident response. The Frequentis Operations Communications Manager (OCM), and Incident and



The ICM mobile application © Frequentis

Crisis Management (ICM) software solutions are specifically designed to deliver the required integration to optimise those performance indicators.

Business Continuity

The rail network is a vital piece of infrastructure and must be maintained and operational regardless of the circumstances. For organisations undergoing enforced business downtime, this can be treated as a chance to analyse and implement key improvements in operational and business processes.

The Frequentis ICM software solution for railways enables distributed working via mobile app and the installation of an emergency client at remote working sites, laptops and computers. Two existing customers already use ICM with virtualised desktops, allowing more flexibility for both routine work and business continuity scenarios.

Face coverings are not the only measure in place to protect customers; in some countries, capacity limits have been set for each train to allow social distancing to be maintained. It is therefore even more essential that disruptions are dealt with swiftly, to keep passengers moving. The ICM mobile application can also provide staff at stations and on trains with real-time information about what's happening, which can be passed on to passengers.

How Does the Technology Work?

The Frequentis OCM software solution offers a unified communications and control

interface allowing rail controllers to communicate with numerous stakeholders across different networks and technologies, as well as different devices. This improves the decision-making processes.

The OCM is designed to act as the starting point for an efficient and paperless workflow for operational communication and for incident management by allowing its operator to enter new incidents automated or semi-automated when they occur. All the incidents present in an operators' designated area can also be seen through their console. When an incident is entered into the OCM, the incident manager will be notified immediately at the ICM, and all the relevant information will be presented to them.

Frequentis suggests an ICM solution as a "single source of truth" for railway operators. By integrating the OCM effectively with the ICM platform, the cause of an incident and how to deal with it can be simultaneously identified and performed from the same tools. This is the first step of any incident response, allowing it to be directed to the appropriate staff and handled quickly.

By introducing better integration, different groups can work together on the same incident, adding and editing information simultaneously. This improves response times, because the driver of the train, for example, doesn't have to repeat the details of the issue again when it reaches the incident response manager. Such efficient sharing of information is key to a fast and efficient incident resolution. With closer integration, you shorten the response time with a tool that also reduces the complexity of the decision-making process.

After serving as the point of entry for the incident response process, the OCM may also act as the front end, web-based graphical user interface for the ICM itself. This enables a full integration of communication and management procedures. The extent to which these should be integrated depends on operational needs, operational procedures and how incident management is handled by the organisation. Either way, the flexibility of the software is such that it can be tailored to these needs.

Increasing Automation

Our intention with this technology software solution is to drive automation to the next level, remove duplication and provide information as soon as possible in this workflow, always in electronic form, and always with automatic handover between the systems. Without paperwork, the need to re-enter duplicated information is eliminated and as a consequence the process becomes significantly more efficient.

Despite the pandemic, rail is set to continue on a path of ever-increasing capacity demand, intensifying the need for swift recovery from operational disruptions. As passengers start to return to railways, it is important to look at the procedures and software solutions that will let you keep calm and carry on should any incident or even another crisis scenario occur. There is a potential to simultaneously enhance passenger safety with integrated software solutions for improved, digitalised and virtualised operations – this shouldn't be wasted.

Author Bio

Markus Myslivec, Frequentis Head of Public Transport Solutions

Markus has a long history in railway communications, ranging from software development for GSM-R mobile terminals to technical leadership in fixed line operational communication projects. He represents Frequentis within ETSI TC RT and the UNITEL committee. He is heavily engaged in inter-domain knowledge and technology transfer for other areas of Frequentis business.

Company Bio

Frequentis Public Transport solutions leverage more than seventy years of experience focusing on safety-critical communications and applications. Cross-industry expertise gained from supporting control centre communication sets the foundation for industry-leading railway and urban transport solutions. With its strong position in operations communication, as well as incident and crisis management, the company also holds the number one market share in GSM-R dispatcher terminal positions; more than 8,000 units are currently deployed in customer control centres in over 25 countries. Customers include Network Rail in the UK, Deutsche Bahn in Germany, ÖBB and Wiener Linien in Austria and Sydney Trains in Australia.

For more information visit www.frequentis.com/public-transport

InnoTrans 2020: The Virtual Market Place Gets a Boost

As of 21 September InnoTrans will give exhibitors a preview of the main attractions that will be on display at the event in April 2021.

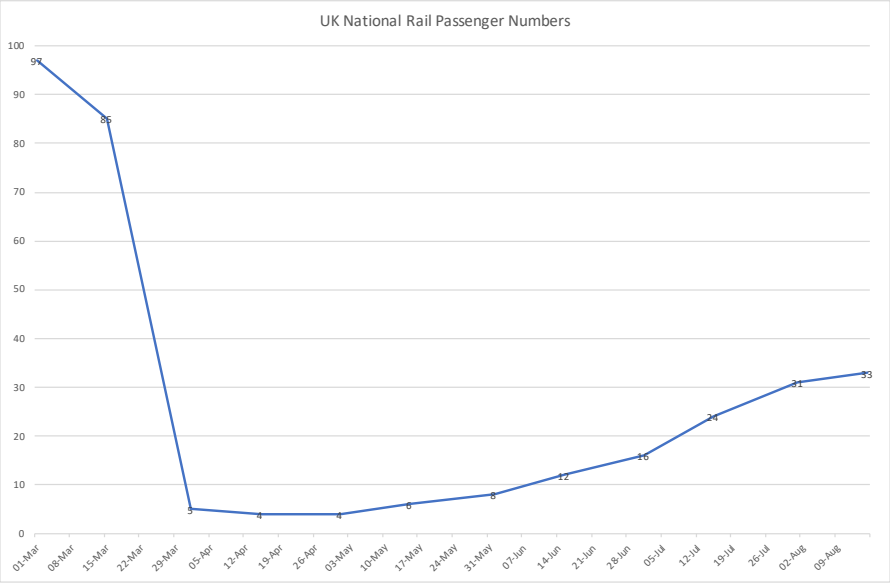
The digital preview will highlight innovations in the areas of Railway Technology, Railway Infrastructure, Public Transport, Interiors, and Tunnel Construction.

This will happen at the Virtual Market Place, which will be redesigned and get a number of new services, such as videos, 3D images, webinars and virtual tours of trains and factory floors.

Exhibitors can book the new services online.

Rail Passenger Number Recovery

The UK Department for Transport (DfT) has been publishing weekly figures for rail passenger numbers – both for the national rail network and for the London Underground, starting on 1 March 2020.



National rail passenger numbers began to drop to below the levels of the equivalent 2019 week in mid-March, reaching 51 percent by 19 March and then single digits at 9 percent on 28 March. The lowest figure – 4 percent – was reached for the first time on 10 April, where it hovered until figures started climbing again in early May, reaching double digits (10 percent) for the first time again on 3 June. Figures at the weekends are slightly higher than mid-week figures and the highest level reached so far has been 34 percent for the weekend of 8 and 9 August. Passenger behaviour on the London Underground has roughly tracked that of the national network.

FLUIDMESH NETWORKS

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SYTRAL Deploys Real-Time Video Surveillance

Leveraging Fluidmesh Train-to-Ground for Lines B and D of the Lyon Metro

As the third-largest city in France, Lyon has evolved into a dynamic twenty-first century metropole driven by the information technology industry. Lyon has always had a compelling need to move large numbers of people on a daily basis and, maintaining its status as a world pioneer in rail transport, the city has been modernising its infrastructures.

Passenger security is top priority on public transport. Having successfully used Fluidmesh wireless Train-To-Ground technology to facilitate wireless connection of its trains, the Syndicat mixte des transport pour le Rhône et l'agglomération Lyonnaise (SYTRAL) recently demonstrated their commitment to security, and their faith in Fluidmesh, by implementing a real-time wireless video-surveillance system providing continuous video streams from trains to the main control room.

The new surveillance system contains more than 1,000 new cameras installed on 48 Line D and 36 Line B trains. Security personnel can monitor any camera from the main control room in real time. Regardless of the relative position and speed of any train, Fluidmesh technology provides a broadband wireless link that reliably connects each on-board network and associated camera with the main network running along the tracks.

This MPLS-based trackside wireless deployment is top-class in France. It has set new standards for throughput availability on trains, and resolution of streaming video. The infrastructure is robust, redundant and fault-tolerant, and the Fluidmesh radio technology can accommodate potential failures or attacks in milliseconds by re-routing traffic and re-connecting trains through alternative or redundant devices.

The IET department of SPIE Sud-Est, decided to work with Fluidmesh and Cisco after a similar application was recently deployed in Italy to enhance the security of a major underground metro system.

The Fluidmesh technology employed by the SYTRAL project yields a significant reduction in total cost of ownership (TCO) by limiting the number of wireless base stations needed (compared to traditional Wi-Fi-based solutions). Fluidmesh's patented MPLS-based wireless technology proved itself superior to WiFi and LTE-based solutions by providing continuous connection, with no streaming interruptions when trains move between wireless coverage zones. Fluidmesh's trackside Train-To-Ground hardware is fully integrated with the Cisco MPLS fiber infrastructure installed in parallel. Finally, Fluidmesh's fault-tolerance algorithms were a deciding factor in meeting SYTRAL's demanding mission-critical requirements.

NextiraOne explains: *"SYTRAL's requirement was to implement a redundant system capable of switching from the main network to the backup one in a few milliseconds. This is a very demanding requirement for a wireless system; conventional technologies just can't do it. Fluidmesh gave us the optimal solution and support and was able to deliver the needed performance."*

The Lyon metro network video-surveillance system is already operational, and clearly demonstrates that where security is paramount and any downtime could decide between just another day on the metro and a major disaster, Fluidmesh has the solution.

CableGuardian by Viper Innovations

The First Tier 1 Signalling Power Monitoring & Fault-Finding System for the Rail Network in the UK

Network Rail has approved the first Tier 1 Signalling Power Monitoring & Fault-Finding System for the rail network in the UK. This forward-thinking collaboration with Viper Innovations is now set to improve safety across the rail network and reduce the number of service-affecting failures.

For the last 5 years, Viper Innovations has collaborated with Network Rail's engineers and maintenance technicians to perfect a new monitoring and fault-finding system to transform the way railway signals are monitored and faults are managed on the rail network. Now, after extensive R&D and live trials, CableGuardian is approved for use across all Network Rail regions. This fault-predicting and detection system will revolutionise the speed at which trackside fault finding is performed and avoid the inefficient process of rail engineers walking the lines to needlessly test healthy cables and manually identify fault locations, freeing them up to work through their maintenance backlog priorities.

While Viper Innovations is better known for its successes revolutionising subsea cable monitoring technology, its sights are now firmly set on delivering the benefits of its knowledge and expertise to the rail industry. Viper's transfer of knowledge is not as unusual a fit as you may

think, if you consider that power system electrical components, whether submerged thousands of metres underwater or exposed to the elements trackside, must operate safely in extremely harsh environments. Indeed, the issues oil field and rail operators face are remarkably similar with safety being the primary concern, whilst downtime incurred from electrical faults has the potential to cause major disruption, inconvenience and significant financial repercussions.

CableGuardian provides a solution as a sophisticated cloud-hosted cable monitoring and fault-finding system designed to prevent service-affecting failures by enabling asset maintainers to predict faults before they occur. The system delivers precise condition trending down to individual cable level and can accurately pinpoint fault locations and instances of theft and vandalism. The technology operates continuously on live power networks providing critical cable insulation and conductor integrity information in real time, eliminating the need to power down the system for intrusive periodic testing and enabling a move to proactive, risk-based, maintenance.

CableGuardian monitors cable insulation and conductor condition within a power distribution network by dispersing multiple independent measurement units within principal and auxiliary power supply points and location cases. It breaks away from the traditional limitations of insulation-monitoring devices that offer only a single Insulation Resistance measurement for the complete circuit. It is the first and only system that has full product acceptance at Tier 3, Tier 2 & Tier 1 monitoring levels in the Network Rail standard NR/L2/SIGELP/27725 – Insulation Monitoring and Fault Location Systems for use on Signalling Power Systems. At this stage, the full product acceptance covers use on any DC-electrified and non-electrified areas, with the existing trial acceptance for overhead electrified railways scheduled for conversion to full acceptance later this year.

The beauty of the system is that it can be installed very quickly and easily without turning off the 650V signalling power supply, typically taking less than an hour per unit to retrofit. Once commissioned, the equipment requires no scheduled maintenance and any software updates can be done remotely.

Communications have been future-proofed by the inclusion of on-board Ethernet, Fibre Optic and 4G cellular options. The system analyses the sensor data, providing continuous monitoring of the live system and indicating the location of any cable or conductor faults without the need to power down the system, reducing the frequency and duration of trackside fault-finding campaigns.

Importantly, CableGuardian offers a proactive and smart online technological alternative to the intrusive periodic manual cable testing requirements of Network Rail standard NR/L2/SIGELP/50000 empowering the rail industry to move from the uncertainty of periodic electrical network testing, to a real-time condition-based approach.

This unique technology supports Network Rail's ambitions to improve safety by reducing the need for manual trackside fault-finding and reduce maintenance costs. It is the only system which continuously monitors and reports cable health by Sub-Network section, providing individual Insulation Resistance values for each Sub-Network

Section. It identifies emerging faults before they become critical or worse still, a service-affecting failure and allows key stakeholders to make informed decisions.

Crucially, the CableGuardian portal has been developed with the Network Rail Intelligent Infrastructure integration in mind throughout. Integration of CableGuardian to the latest Intelligent Infrastructure RADAR system currently in development is a crucial step in Network Rail's strategy to introduce proactive, risk-based maintenance of signalling power systems, predicting and preventing service affecting failures and helping to ensure that railway passengers arrive on time.

CableGuardian has been designed, developed, manufactured and tested in the UK and is fully compliant with all relevant standards for safety, electromagnetic compatibility (EMC) and environmental conditions for use on the UK rail network, including being rated for Class II electrical isolation.

www.viperinnovations.com/cableguardian

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21 October 2020
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Europe/Berlin Central European Time
English-speaking

21 October 2020
09:30 -10:30 a.m.
New York City Time
English-speaking

Efficient Cleaning of Railway Parts

Fast and Economical Cleaning of Heavy Components

Often Underrated: cleaning as a key factor for smooth maintenance

Cleaning of railway components plays an important role for fast and smooth processing of repairs, crack testing, maintenance and servicing. Long servicing intervals and high mileages leave strong contamination on bogies, wheelsets, wheel bearings and train motors. These substantial contaminations, oil and rust often pose great challenges for the service providers who clean these parts. In addition, the railway parts are often real heavyweights that many cleaning systems cannot handle.

Modern Cleaning of Drive Bogies and Wheel Bearings with Maximum Precision

A fast and economical cleaning solution was found for a maintenance plant of an Austrian railway company. The maintenance plant decided to purchase two cleaning systems from the German manufacturer BvL Oberflächentechnik GmbH in Emsbüren. BvL specialises in the development of cleaning systems in different sizes for maximum cleanliness requirements. The company offers a variety of solutions for cleaning components as part of maintenance and quality testing for transport companies. BvL especially impressed with more than 30 years of experience, proven quality and international references in the railway sector. The cleaning requirements and the local conditions were clarified during intensive exchanges between the representatives of the purchaser, the manufacturer and the Austrian sales partner Glogar Umwelttechnik GmbH. After conducting extensive washing trials at the BvL Technology Centre, a decision was made in favour of the Pacific spray system for cleaning large parts and the Niagara spray flood system for cleaning bearings.

Large Parts System Pacific: washing, rinsing and drying bogies in one chamber

Once the electronic system control has been individually programmed and the electric lifting gates are closed, the bogies, wheelsets and frames are cleaned in the treatment chamber by an integrated spraying device with an oscillating special nozzle system with wide spray nozzles. Two powerful circulation pumps supply the wide spray nozzles with water. After this intensive treatment, the parts are rinsed in the same chamber by a separate spraying system. The high washing temperatures up to 75°C ensure energy efficient drying of the cleaned parts using intrinsic heat.

Niagara Bearing Washing System: joint cleaning of bearings and bearing housings in one washing chamber

Fine sand on the bearings is removed without residue. This can prevent premature wear of axle bearings. The bearings are attached to special parts baskets and cleaned in a washing chamber. Intensive cleaning is achieved with a special nozzle system with flat spray nozzles while the parts basket rotates around its horizontal axis and by completely flooding the cleaning chamber.

Clean Components with Adapted Filters and Bath Sensors

The condition of the washing and rinsing water is of great importance for reliable, constant cleanliness of the cleaned parts. To achieve this, the medium is transported on a belt filter to remove any solids. Tank rinsing in the pressure line of the washing and rinsing pump and a ring line above the tank floor swirl up these solids in both tanks as a preparatory measure. A plate phase separator additionally provides oil separation. All BvL systems are equipped with a sensor system as a standard (Libelle Fluid Control) to permanently measure the contamination level of the cleaning fluid by measuring light absorption. This allows the user to immediately identify when a bath change is required.

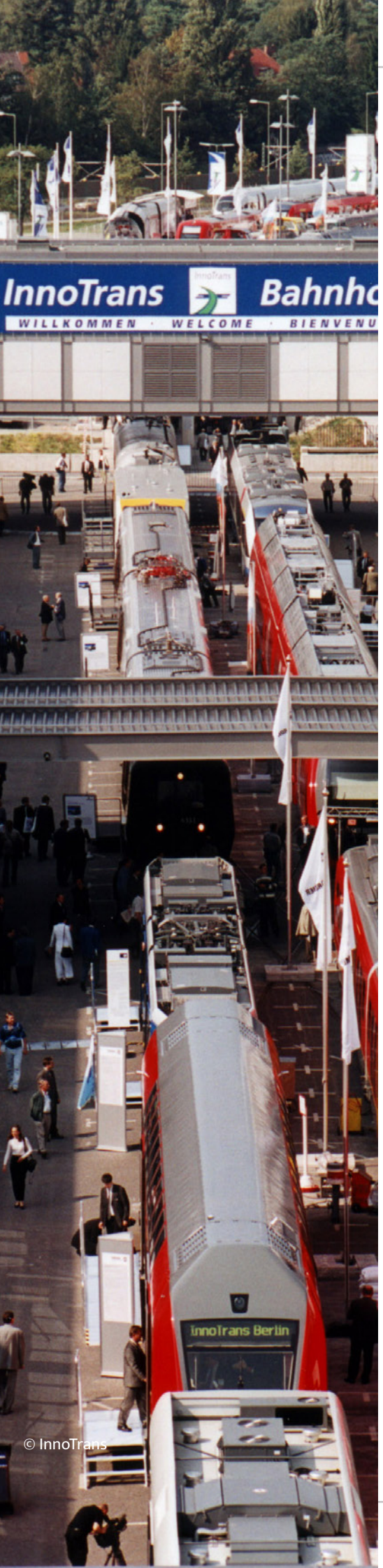
Environmentally Friendly and Energy Efficient Cleaning

After filtering, the wastewater is reintroduced into the system, saving as much energy and water as possible in addition to ensuring a long bath life. The additional flexible insulation material on the pipes, filters and tank covers increases the output of thermal energy. In addition to reducing energy costs, the BvL systems meet the environmental protection requirements. This safeguards the investment in the future.

Ideal Cleaning Solution

With the BvL Pacific and Niagara systems, the Austrian maintenance plant receives a cleaning solution that meets all its requirements: both systems achieve very good cleaning results, the fully automatic function makes handling user-friendly. Because of the positioning of the large-parts system in a pit, the system can be fed easily and offers easy maintenance access. 100 percent availability of the systems as well as linking all washing cycles to other data interfaces also play an important role.

BvL Oberflächentechnik GmbH
www.bvl-group.de
www.glogar-uwt.com



© InnoTrans

InnoTrans 2000: 20 Years On

InnoTrans 2000 took place 12–15 September. It experienced a doubling of exhibitor numbers, reaching 827 from 25 countries. The fair attracted 23,737 visitors over the four days.

The year 2000 was the first that the InnoTrans Convention took place, giving the event a clearly structured expert framework programme. This was therefore the year InnoTrans got the three pillars it still stands on today: the exhibition halls, the outdoor display, and the convention.

The Outdoor Display at Berlin Messe opened for InnoTrans 1998 and by InnoTrans 2000 had been expanded to two kilometres up from 800m. It was also the first time the tracks ran right up to the exhibition halls. At 50 exhibits they were completely full.

Alstom Lirex

The LIREX project was developed by Alstom in co-operation with Deutsche Bahn. It attracted great attention at InnoTrans 2000. LIREX stands for 'Leichter, innovativer Regionalexpress' – 'Light Innovative Regional Express'. The first fully low-floor six-car multiple unit of this type was originally intended as a test vehicle for new technology for regional trains. The project, which was supported in part by the state of Saxony-Anhalt, was a modular multiple unit that could be fitted with electric, diesel-electric or hybrid traction.

The concept was developed further, resulting in the Coradia Nordic and the Coradia Continental.

ICE TD

One of the main attractions at InnoTrans 2000 was the ICE TD, the diesel-electric multiple unit built by Siemens and Bombardier for Deutsche Bahn.

A total of 20 of these tilting trainsets were built between 1997 and 1999 for DB Fernverkehr. They remained in service until 2017, operating as Class 605s. They entered regular passenger service between Dresden and Nuremberg, and between Munich and Zurich. Both of these routes are only partially electrified, hence the use of diesel-powered trains. Most of the ICE TD trains were taken out of service on 11 December 2016 with 4 of the 20 units remaining available. The ICE TD continued to operate until 1 October 2017 on the route between Hamburg and Denmark.

One of the units has been repurposed as the 'advanced TrainLab' (2018), with the purpose of testing new technologies for the rail sector. A second ICE TD acts as a back-up vehicle.

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Minimise Human Error and Protect Workers' Safety with Protran Technology's Railway Worker Protection Systems

Utilising Protran Technology's Ranging Protracker System, both personnel and train fleets are outfitted with Protran equipment so that workers will receive an alarm when a train is approaching, and train operators receive an alarm that they are approaching workers ahead on the tracks.

This sophisticated technology includes a user-friendly display that tells train operators how far they are from a worker and allows workers to communicate to the train that they are in a position of safety. When combined with appropriate operating rules, these systems virtually eliminate all close calls.

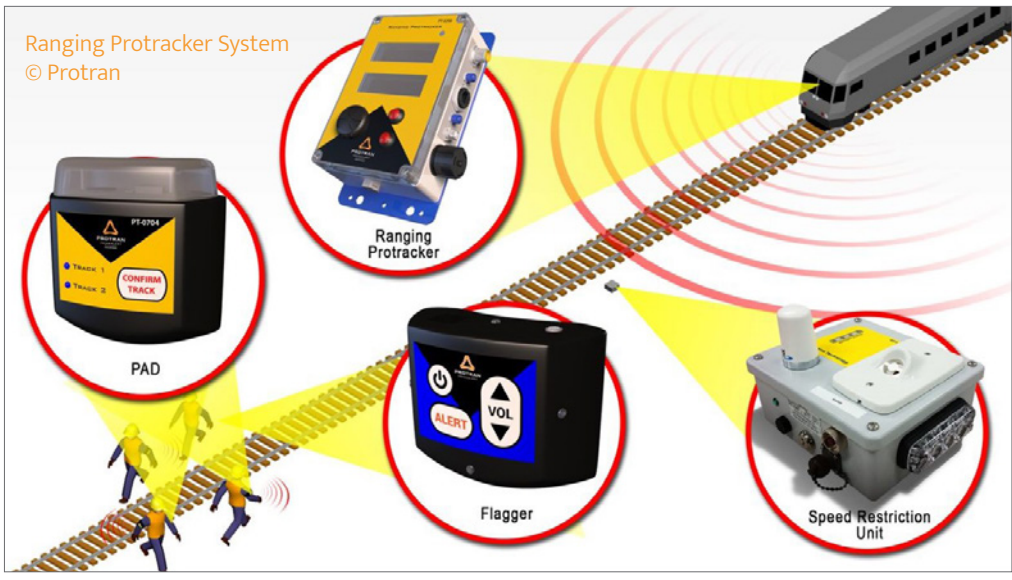
One of the many benefits of the Ranging Protracker is ease of use. Daily setup is virtually automatic as the system turns on when the train is powered up and the workers wearing the devices are always protected. The initial installation of this system is very simple and can be integrated into any existing fleet or new build of transit vehicles. The system is low-maintenance and simple to use; training for both the operator and the track worker is quick and easy; understanding the functionality is quite intuitive.

The Ranging Protracker safety system is made up of four main components:

- Ranging Train Mounted Device
- Portable Warning Horn & Light + Repeater
- Personal Alert Device (PAD)
- Flagger Device

The Protran Technology Ranging Protracker train device is designed to be mounted in the cab of a train utilising the custom Protracker Antenna Kit. The train operator will be audibly and visually alerted of personnel near the train tracks who are wearing the Protracker Personal Alert Devices (PAD).

The cab-mounted device provides train drivers with a large display in which they receive distance-to-worker information and confirmation that a worker has received the train approach warning. This system requires



Ranging Protracker System
© Protran

Train Mounted Unit
© Protran

railway workers to 'confirm' they are clear of the train and indicate to the train driver that they may proceed. If the worker does not indicate they are clear, the driver can stop at a pre-determined distance.

The Portable Warning Horn & Light (PWH&L) is placed at the beginning of the work zone where it can be seen and heard by the work crew. The Portable Warning Horn & Light device gives an audible and visual alarm to the workers when a train/vehicle is approaching. This device is activated automatically by the Ranging Protracker train-mounted unit and can also be activated manually using the Flagger Device. In long work zones or areas frequented by high-speed trains, multiple Portable Warning Horn & Light devices can be spread out along the work zone to repeat the warning signal from either the Ranging Protracker train-mounted unit or Flagger Unit.

The Personal Alert Device (PAD) is worn by track workers to provide an audible and visual advance warning to the workers that a train is approaching the work zone. The Ranging Protracker system detects workers on the tracks who are wearing the Personal Alert Device (and Flagger Device) and will provide ample time for workers to move to a place of safety. The PAD (and Flagger) device will communicate with the cab-mounted train driver device and confirm to the train driver that the worker has received the warning alarm and it is safe to proceed. The Flagger Device is utilised by

PAD © Protran

the person acting as the Flagger / Watchperson / Lookout or the Employee in Charge. This device functions the same as the Personal Alert Device worn by the track workers but has one additional feature: a manual ALERT button. The ALERT button allows the Flagger / Watchperson to be able to manually alert all the PWH&Ls and PADs in the work zone of an approaching train or other on-track vehicle or any other emergency event that would require a warning notification to the crew.
The Ranging Protracker Railway

Flagger Device
© Protran

Worker Protection system provides workers with ample time to clear to a place of safety and offers configurable alarm parameters: distance-based alarms or time-based alarms, as well as discernible 'second train' alarms. This system enhances an agency's existing safety procedures utilising GPS and ranging radio technology with multiple interfaces such as Ethernet, RS232, and RS485.

The Ranging Protracker System provides data logging of all alert and detection events to improve an agency's data collection capabilities and can be used to validate existing procedures and assist in incident investigations (near misses, accidents, etc).

Protran Technology offers reliable Railway Worker Protection systems that are easy to implement from installation to everyday use with low maintenance that easily fit into any agency's standard operating procedures. Having a system with the flexibility to be configured to meet the unique operating environment is important and necessary to be effective. These tools provide advance warning to operators and track workers to help mitigate accidents, save lives and provide a better sense of well-being for workers.

Introducing: Lantal's New Global Business Hub for Ground Transportation

The Lantal Textiles Group has been a global player in the mass transport industry since 1954 with an ambitious plan to grow its market share further.

In order to ensure this growth, the Lantal Group acquired Gierlings Velpor from the Amorim Group in late 2016.

This strategic takeover was a perfect match for both companies, as Gierlings Velpor had a long history and a lot of experience in the textile industry. Combined with Lantal's expertise in the ground transportation segment and new investments in our production lines we will able to guarantee the best-possible service and quality to our customers on a global level.

Gierlings Velpor was renamed Lantal Textiles SA in July 2019 in order to formalise the change. Now we are ready to take the next steps in our strategy. Starting in early 2021 Lantal Textiles SA will become our new global hub for the ground transportation business.

It will be from here that we will plan and manage our ground transportation market strategy, production and supply chain.

Focusing our efforts and resources in this manner will result in our customers seeing better response times and better lead times, while maintaining the same quality and design capabilities the Lantal Group is famous for.

We are looking forward to sharing this new chapter with our customers and remain committed to be the go-to partner for the ground transportation market.

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More information opposite!

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So that Peace and Quiet Is Not Left by the Wayside: Our Flame-Retardant Sound Deadening Solution Absorbs Structure-Borne Noise in Trains

Solvent-Free Artificial Resin Dispersion Achieves High Acoustic Effectiveness

When talking about travel comfort, it's not only speed, comfortable seating and legroom that are important, so too is a feeling of spaciousness within the train compartment or aircraft cabin. Passengers who wish to work or rest undisturbed during their journey can choose quiet compartments in trains, where loud speaking, mobile phone use and other noisy activities are prohibited. In order to reduce the structure-borne noise of the rail carriages themselves and therefore to create the quietest-possible environment inside, many rolling stock manufacturers use sound deadening.

The metal sheets used in the interior construction of carriages – for cladding for example – are covered in sound deadening materials to dampen the noise caused by the metal sheets.

The paint and coating experts at griwecolor GmbH have two products in their portfolio that have been developed for this area of application: griwephon AN2-800 and griwephon light AN2-900.

Fire Safety

The product range has now been expanded to include the new griwephon AN2-750/EU, which is classified as a non-flammable product, class A2, according to DIN EN 13501-1. The product passed the toxicological testing for use in rail vehicles with flying colours.

All three ready-to-use one-

Griwephon © GRIWECOLOR GMBH

component solutions have also been tested for fire behaviour in accordance to EU rail vehicle standard DIN EN 45545-2.

Griwephon AN2-800 and AN2-900 meet the requirement sets R1, R2, R3, R6, R7 and R17 in the hazard levels HL1, HL2 and HL3.

Furthermore, all three products have a very high acoustic effectiveness in accordance with DIN EN ISO 6721-3.
Some people find that the monotonous noise produced by train wheels on the tracks makes them sleepy; others struggle to cut out external influences of this kind in order to sleep or work in a concentrated manner.

Sound insulation and the reduction of structure-borne noise in rail vehicles to give passengers a relaxing journey is therefore a big challenge for engineers. Although some components can be produced from alternative materials, it is often not possible to avoid thin-walled sheet metal constructions, where significant vibration is unavoidable. This causes irritating background noises.

AN2-750/EU has been classified as a non-combustible product, class A2, in line with DIN EN 13501-1; it has also passed the toxicity and smoke gas density test in line with the DB Systemtechnik specifications without a hitch.

It therefore meets the requirement set R1 for HL1, HL2 and HL3 for application in rail vehicles with regard to smoke development and toxicity.

Like the two variants already on the market, the sound deadening solution based on aqueous synthetic resin dispersion is also hydrophobic and solvent-free.

Sound Insulation through Structure-borne Noise Absorption

Large-scale sheet metal is often used in the manufacture of railway carriages. These vibrate when the train is moving, producing noise. This structure-borne noise spreads almost unhindered and without loss in metal vehicle components. These sound waves are then transmitted to the air so that the sound occurs as an audible noise inside the car.

In order to prevent this noise generation, which can be irritating, homogeneous layers are placed between the individual elements for internal damping. Thanks to its composition of inorganic components in conjunction with a low proportion of organic components, the griwecolor sound deadening solution achieves a very high acoustic damping effect. When the griwephon layer

"The development of our sound deadening griwephon AN2-750/EU is based on the extensive experience that we have collected with AN2-800 and AN2-900 as well as in the construction material sector. With these products, we have gathered decades of know-how in the noise reduction of rail vehicles and façade elements or windows, which we have benefited from in the further development with regard to reduced smoke density and smoke gas toxicity as well as acoustic effectiveness and flame retardancy."

"Thanks to the special composition of our sound deadening, we achieve a very good value in terms of internal damping. The loss factor, depending on the installation situation, application thickness and material in accordance with DIN EN ISO 6271-3, is between 0.22 and 0.24, so that large parts of the structure-borne noise energy are absorbed by the sound deadening."


© GRIWECOLOR GMBH

penetrates the material to which it has been applied, the vibrational energy of the material is largely eliminated because it converts high-frequency vibrations into low-frequency ones. As a result, rail vehicle bodies emit less noise to the air in their interior space.

Thanks to the application of a filler combination made of various mineral substances, such as aluminium hydroxide, as well as the development of a special binder with high toughness, an application thickness in double sheet thickness up to 5mm is possible. The quality of the filler and the unusual layer thickness are jointly responsible for the high absorption rate. Another advantage of the mineral components is their low thermal conductivity.

with atomising air of roughly 12:1, or screw conveyors with atomising air with an inlet pressure of 3 to 4 bars.

Manual application using a spatula or mortar adhesive trowel is also possible. The sound deadening solution is characterised by a high level of stability when applied to vertical surfaces. In wet application, a layer thickness of up to 5mm is possible in one go, without the product slipping off or cracks forming on the surface.

After the drying process, the layer thickness is approximately 4 to 4.5mm.

Further information at:
www.griwecolor.de

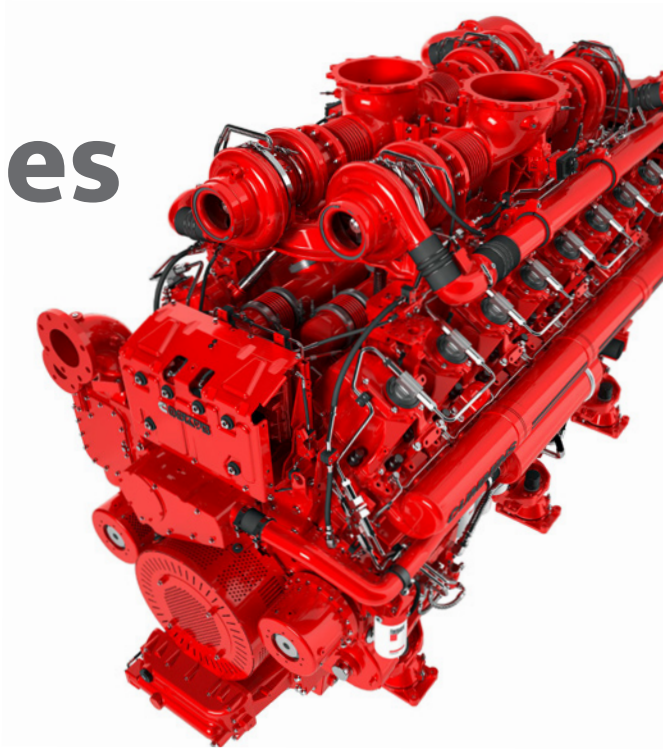
"The processing is therefore quick, safe, clean and does not contain any health risks due to the ingredients. Even in the case of a fire, griwephon AN2-750/EU does not generate any toxic gases. The material was tested in accordance with DIN EN 45545-2 with very good results with regard to smoke density and smoke gas toxicity. Our griwephon sound deadening therefore connects fire protection with simple handling and efficient noise protection."

Easy Processing without Health Risks

Thanks to its composition, the sound deadening solution can be applied both with airless devices, with a ratio of at least 60:1, and with reciprocating pump devices,

"As with all of our products, we have also paid attention with griwephon AN2-750/EU, AN2-800 and AN2-900 to environmental and health compatibility and easy application. On the basis of an aqueous synthetic resin dispersion, we do completely without solvents in order to achieve the lowest possible VOC proportion. Through intensive development work, we were able to achieve a value of less than 0.6 g/litre."

Cummins Engines Powering Rolling Stock Around the World



Wherever there's advanced rail technology, you'll find Cummins power.

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We offer a full line of ratings, with many engine models specifically modified for railway equipment Cummins railcar engines, for instance, utilise low-profile designs for use under the car floor, with access to service points from underneath the engine, not inside the passenger compartment. The 750-hp QSK19 is the newest of our 'horizontal' engines, and has the capacity to drive a new generation of high-speed DMUs, with projected speeds of up to 210km/h.

For locomotive power, Cummins offers a comprehensive range of high-performance, low-maintenance diesels to meet your needs. 12 different engines are available in a wide range of horsepower, including V12 and V16 configurations. With ratings of up to 2100 rpm, these engines are more fuel efficient, more space efficient, have longer service intervals and a higher

power-to-weight ratio than low-speed units.

Low cost-of-operation and high dependability also make Cummins engines ideal for track maintenance equipment. We know that for the trains to run on time, you have to keep your tracks up to speed – every day.

Cummins also knows that trains don't move unless people get training. That's why we offer specialist service training for operator personnel at our international training centre in Daventry, England.

A Better Train of Thought

For locomotive builders looking for a new-power approach to achieve cleaner, more efficient performance, the QSK95 engine arrives on time to deliver radically improved power capability for both freight and passenger operations.

With over 4000-hp (2983 kW) output from 16 cylinders, the QSK95 surpasses other high-speed engines. In terms of emissions capability and compact installation, the QSK95 is way ahead of much larger medium-speed engines with a similar output.

High power density, together with Cummins space-saving exhaust after-treatment, creates a lighter, fully integrated emissionised power solution designed to meet all of the requirements for new high-speed passenger locomotives. Operators of multi-purpose freight locomotives from 3600 hp (2684 kW) will find the QSK95 a cost-effective and very dependable power solution – keeping train operations on schedule.

The QSK95 delivers even more fuel savings to line-haul freight applications when used together with a smaller Cummins locomotive engine for full pulling power when you need it, and the best-possible fuel economy at lower power levels. A smart power-sharing system transfers work between the two engines to match the locomotive duty cycle, so that overall fuel and operational costs are significantly reduced – an advantage that represents a better train of thought over current conventionally powered locomotives.

The Cummins exhaust after-treatment system is purpose-designed for locomotive installations, using Selective Catalytic Reduction (SCR) technology. This unique, modular system minimises space claim and improves fuel efficiency, lowering the overall cost of operation. Without exhaust after-treatment, the QSK95 engine meets Tier 3 locomotive emissions and is ideally suited for locomotives operating anywhere in the world, however tough the conditions. The engine is built ultra-strong for this purpose, with very long life-to-overhaul offering a major reduction in total life-cycle costs.

The space-efficient design of the QSK95 enables easier service accessibility than is typical for engines of this output, as all key cooling, oil and fuel system components are externally engine-mounted, providing rapid access.

Cummins®

RIEGL®

Mobile LiDAR Systems in Comparison

Tasks and efficiency of flexible and permanently installed measuring systems in route monitoring

LiDAR (Light Detection and Ranging) surveying systems are characterised by specific technological advantages, including speed of data acquisition, independence from ambient light conditions and the ability to detect multiple targets in one direction.

These characteristics explain why LiDAR is one of the favoured surveying technologies in the railway sector – not only by means of systems installed on a train, as in Mobile Laser Scanning (MLS). Relevant surveying data is also acquired using Airborne Laser Scanning (ALS), Terrestrial Laser Scanning (TLS) or UAV-based (Unmanned) Laser Scanning (ULS), depending on the task.

Airborne Laser Scanning is predestined for topographic surveys of very extensive areas. This comes in as a plus in inventory or for planning purposes, where a terrain model (Digital Terrain Model DTM) is needed. Airborne LiDAR systems are also used from lower flight altitudes, both from manned helicopters and by integrating miniature systems on unmanned aerial vehicles in Unmanned Laser Scanning (ULS). Typical tasks – apart from the recording of the immediate railway infrastructure and route monitoring – include documentation of the surrounding topography to secure rail routes and to evaluate the extent of damage or potential risk due to environmental influences.
For highly accurate measurement of very complex environments, static Terrestrial Laser Scanning (TLS) is used. The methodological advantages of TLS devices are particularly evident in tasks where indoor spaces, roofed areas or even underground rooms are to be surveyed. TLS is chosen when the highest measuring accuracy in the millimetre range is required. Ideally,

TLS data from locations that require special attention and detailed accuracy are entered into a primary information data archive.
Finally, there is the operation of the measurement system from the train itself. Mobile systems have been used in this set-up for several years. Aiming for utmost point cloud quality the RIEGL mobile mapping systems are equipped with up to three VUX-1HA high-accuracy laser scanners rigidly coupled with a high grade INS/GNSS sub system. The system architecture, which has to ensure a fix cohesion of all single parts and the perfect synchronisation of the integrated sensors even in the event of – as is to be expected on the train – strong vibrations, is of importance. The higher the pulse repetition rate of the individual scanners, the closer the point spacing within a scan line. This enables the exact measurement of even thin structures such as rail heads and overhead lines. In addition to the pulse repetition rate, the frequency of the scan lines covering 360 degrees is a decisive key figure. The higher the number of scan lines per second, the higher the speed of the train that can be selected without reducing line spacing density during the measuring run.
RIEGL may refer to many years of experience with the mobile LiDAR systems RIEGL VMX-450 and its successor system RIEGL VMX-2HA.

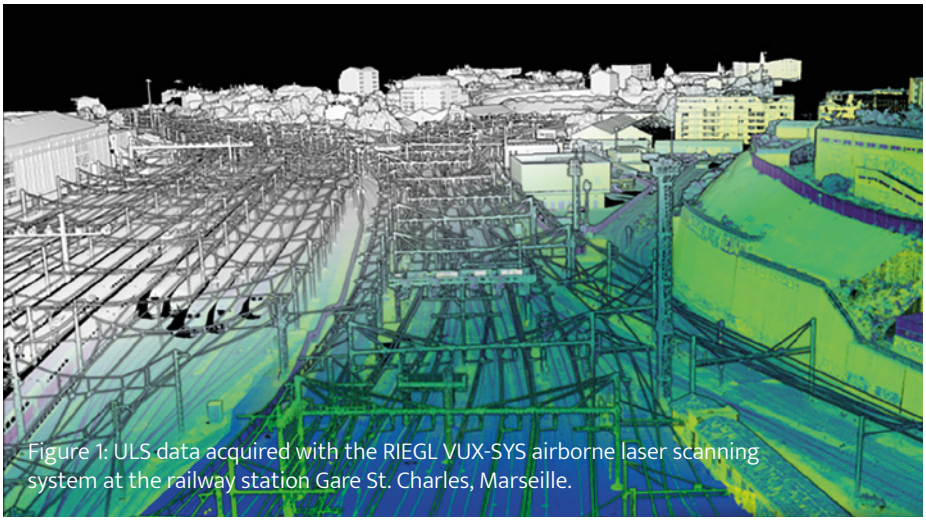

Figure 1: ULS data acquired with the RIEGL VUX-SYS airborne laser scanning system at the railway station Gare St. Charles, Marseille.

These systems comprise two 2D laser scanners oriented obliquely to each other. This orientation generates a simultaneous forward and backward view, enlarging the field of view of the measuring system and reducing shadowed areas. The two measuring ranges overlap to a large extent at surfaces in the centre of the area of interest. This creates an increase in redundancy, detection reliability and generates a regular crossed scan pattern on the track body.
The mobile mapping system's measuring head is installed on the train. The control components (PC, data storage device, power supply) are located at the operator's station inside the rail car. The installation height of the measuring head determines the field of view and the measuring angle of the laser beam on the rail environment.
The main task of LiDAR systems on trains is to monitor the clearance area along the rail track. RIEGL "Smart Waveform" technology allows detecting multiple targets per laser shot, to achieve an optimal distribution of measurement points, and the output of calibrated amplitudes and reflectivity values. Due to these features, the technology is particularly suitable

for surveying and penetrating vegetation. In the railway sector, a meaningful vegetation survey means that safety and maintenance measures can be planned according to the specific local requirements, thus saving on labour and materials. This includes, for example, cutting back obstructive vegetation, applying herbicides along the rail track or maintaining and repairing the railway embankment, whose profile is clearly detected by LiDAR even under vegetation.

The compact design of the VMX-450 and the VMX-2HA systems facilitates project-specific measurements, for which the flexible use of the system on different platforms is advantageous. Additionally, there is currently an increasing demand for permanently installed mobile mapping systems for integration into specifically equipped measuring trains. The RIEGL VMX-RAIL is a such a system designed for permanent installation and operation.

The technical concept of the VMX-RAIL is based on the combination of three high-accuracy laser scanners compactly mounted on one system platform. The integration of three scanners in one system achieves a uniquely dense scan pattern with crossed scan lines. The special arrangement and alignment of the scanners results in a scan shadow-minimised and well-structured point cloud. The point pattern of the VMX-RAIL thus offers an optimal basis for object extraction and 3D modelling.

The measuring head meets the highest standards regarding material stress and protection against environmental influences. The laser scanners are encased in special protective housings which can be dismantled separately if necessary. The same applies to the INS/GNSS unit and the synchronisation electronics. In order to enable integration with different models of measuring trains, the mounting device, which also contains the vibration absorbers, is implemented separately and can be flexibly adapted to the respective conditions.

The number of applications in which digital 3D point clouds or digital 3D models are used in rail-specific applications is constantly increasing. While clearance checking and asset management are still the core applications for kinematically acquired 3D data, today LiDAR is also used for recording highly accurate data for infrastructure maintenance planning. Strong innovation trends in response to the new demands of, for example, increased traffic volumes and automation, promise further challenging tasks for LiDAR surveying in the near future.

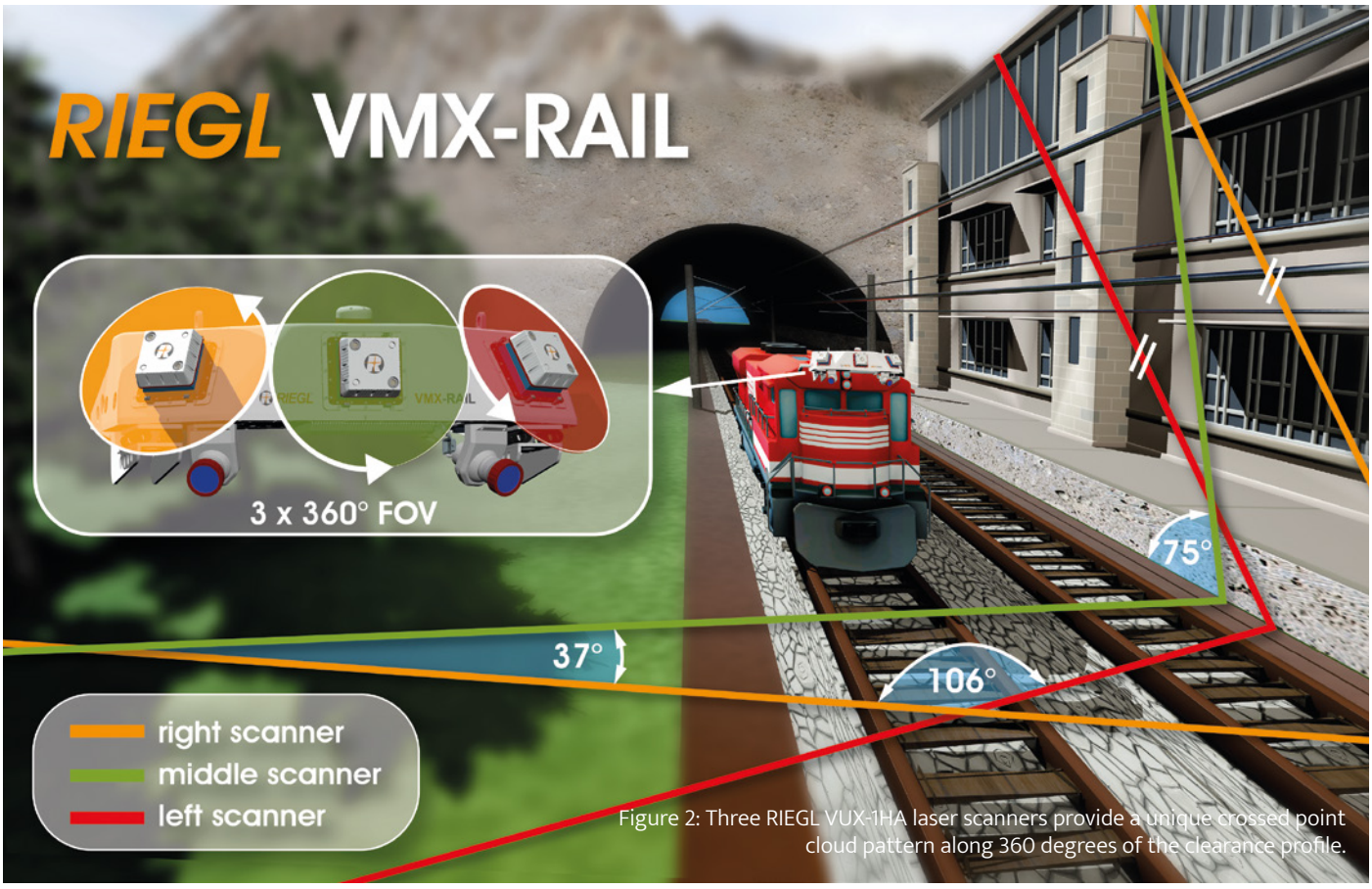

Figure 2: Three RIEGL VUX-1HA laser scanners provide a unique crossed point cloud pattern along 360 degrees of the clearance profile.


WHAT WOULD YOU DO IF A RAILWAY VEHICLE DERAILS?
Holmatro offers the right lightweight rerailing systems to get your railway vehicle back on track in a **safer**, **faster** and more **controllable** way.
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Holmatro's World of Rerailing

You most definitely will have heard of a railway vehicle being put back on track after it derailed. One way of doing that is by using a big crane. Since the overhead power lines need to be removed when using a crane and a crane does not always have access to the track, this is a very time-consuming way of putting a railway vehicle back on track.

In 2015, when the Dutch railway infrastructure manager ProRail was looking for a new system, ProRail and Holmatro started the conversation about what needed to be improved with regards to the previous system.
Holmatro thought the existing systems at that time could be better by means of operation, safety and speed.

Holmatro has therefore engineered a hydraulic rerailing system that is faster and safer and gives operators more control. Holmatro has been manufacturing these systems since 2015. Since then, Holmatro has supplied many of them all over the world. Maybe even your railway company uses one of them.

The new and improved system needed to be built with three main elements in mind:

- speed
- safety
- controllability

These three elements became Holmatro's key pillars when it comes to rerailing.

Speed

The main reason why the previous system needed to be faster is because time is crucial. Especially when downtime costs can add up to more than one million euros per hour.

When trains cannot run or are blocking the tracks, other alternative ways of transportation are needed, which have a negative economic impact.
If you have a system in place which enables operators to work up to two hours faster, you are able to save a lot of time and money.

In addition to the savings you can achieve with a rerailing system, this system also has a positive effect on the environment because fewer busses are needed to transport stranded travellers after a derailment. In general, this means a greener operation with a reduced environmental impact.

Another example where Holmatro made it possible to make the system faster is the use of lightweight components.

These lightweight components are used in the traversing sleds. The traversing sleds replace the rolling carriages that are equipped with steel wheel rollers.

Holmatro uses sleds with UHMWPE (Ultra High Molecular Weight Polyethylene). Because one sled weighs less than 25kg, it can easily be carried and positioned by one person. In addition to the low-friction nature of the product, thanks to the Teflon®-like material, less maintenance is needed. Furthermore, the material lasts longer as there are no wheels which need to be replaced. Another positive side effect is that the sliding bearing doesn't cause any pits and dents in the beams, which could lead to unstable movements of the load.

Inside the bigger sled there is a smaller sled with the same sliding bearings underneath to compensate the radius the railway vehicle makes when put back on track. This means the time taken for re-positioning is reduced substantially.

For the lateral movement a traverse cylinder is required. As Holmatro managed to reduce the weight on the sleds, which means less friction, a smaller cylinder could be used. A smaller cylinder will open and close more quickly and the operation can be done faster.

Safety

A safer system speaks for itself simply because the recovery team needs to work in a safe environment.

That's why some unique safety features have been added to the system. Here are a few of them:

To make the job easier for operators and to avoid a faulty connection on the lifting and sliding cylinders, different types of couplers and different colours of hoses are used.

When a railway vehicle is lifted with the telescopic cylinders these cylinders need to be locked mechanically by using stacking or support rings. These rings ensure that the operator can work near and under the lifted vehicle in a safe and secure way.

All lifting cylinders have a load-lowering valve which makes it easier to lower the railway vehicle. Lifting a load is not that difficult, lowering it in a secure and controlled way is. The unique valve ensures safe and controlled lowering of the vehicle, regardless of the influence of the load on each cylinder. In short, the load (or gravity) doesn't have any effect when retracting the cylinders.

Should for some reason a hose be damaged or broken during an operation, the load is automatically locked because of the hose-rupture valve.

Controllability

By introducing a wireless remote control, Holmatro ensures a more controllable way of rerailing a railway vehicle. This remote control is used instead of a control table or manifolds on the pump.

This way a heavy pump unit can remain inside the recovery vehicle and no separate control table needs to be installed. With the wireless remote control the operator can work closer to the vehicle, has a better overview on the job and can easily walk around during the operation. This makes communication errors less likely as the operator can actually see what's happening and can be close to his or her team members.

But the biggest advantage is the noise reduction because – as mentioned – the pump unit can stay inside the recovery vehicle up to 100 metres away from the incident.

Charging the battery is easy as well by using 230 volts. Upon request the remote can be equipped with standard AA batteries.

Today's Technology

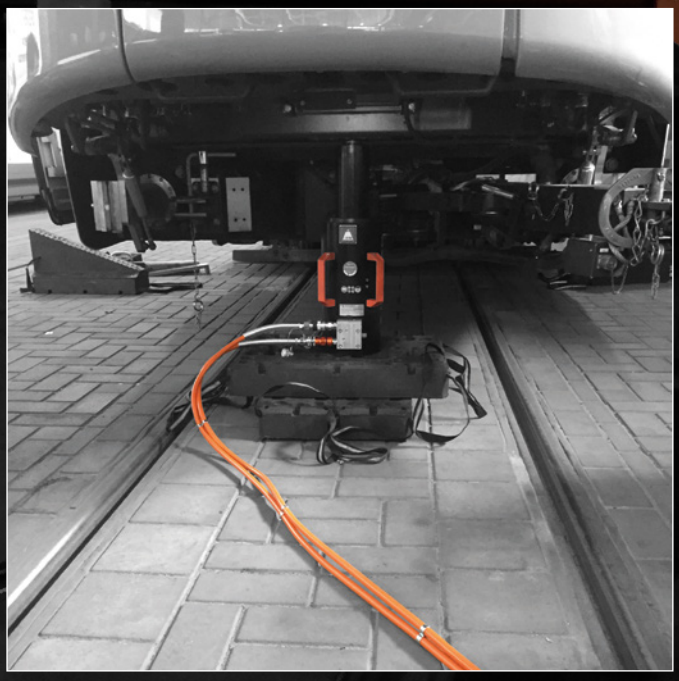
Based on these three key pillars, Holmatro is convinced to have developed a system which is built for tomorrow's use but with today's knowledge and today's technology.

Although the standard systems can be used for 95 percent of all railway vehicles that are available in the world, be this a light rail vehicle, a high-speed train, a shunting machine or locomotive, there is always the possibility of adapting a standard rerailing system to a customers' specific wishes and needs. Holmatro is open to creating the ultimate solution for your application.

Check out www.holmatro.com/rerailing and get inspired!

Join the Rerailing Specialists community on LinkedIn.

Contact us directly via: rerailing@holmatro.com or via phone: +31 (0)162 75 15 00



Supra Roadflex – truck-based rail welding system

Mobile Rail Welding Systems: Supra Multiflex and Supra Roadflex

For mobile welding of continuous welded rails, these machines are normally integrated into an autonomously operating rail welding system.

These systems are equipped with a diesel-generator set, hydraulic unit, cooling unit and a lifting device.

Supra Multiflex Container-Based Rail Welding System

Container systems are especially suitable for welding continuous welded rails directly in new railway track. They are also often used in a semi-stationary manner in depots or near the job site for the preparation of long welded rails for a section in a new railway line.

Supra Roadflex Truck-Based Rail Welding System

The truck-based system is highly flexible as it is self-propelled and can move from one job site to the next within a short time.

Customised System Solutions

Optionally, the welding machines AMS60, AMS100 and AMS200 can also be purchased separately and installed in customer-specific vehicles such as pure track vehicles,

in their own rail-mounted trucks or in excavators. There is also a stand-alone solution for stationary operation in a factory.

Supra Multiflex

Container systems are especially suitable for welding in new railway lines where a lot of new rails have to be placed and many welds have to be carried out. They are also often used in a semi-stationary manner, either in depots or close to the job site where they weld long welded rails for a certain section of new railway line before they are taken to another section.

Schlatter offers a compact 24-foot container that houses all equipment in a space-saving manner. As an alternative a system is available where the equipment is incorporated into two 20-foot containers – the energy container and the welding container.

Supra Roadflex

Supra Roadflex systems are self-propelled. They can work completely autonomously and they are very flexible for moving from one job site to the next. Accessing track is possible from any level crossing (at-grade crossing) and requires little space. Shortly afterwards the system is ready for welding at the job site.

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Supra Multiflex – AMS100 rail welding machine

Supra Roadflex – AMS200 rail welding machine

Supra Multiflex – container based rail welding machine

DON'T LET FAILING SLOPES GET YOU OFF TRACK.

- Provides vegetated slope stabilization that replaces traditional rock riprap
- Easily transported to areas with access challenges
- Verified low carbon footprint that is up to 30 times less than rock riprap
- Quick installation for reduced track downtime
- Cost effective

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Stabilising Transportation Infrastructure with Minimal Carbon Impact

The California Department of Transportation (Caltrans) needed to stabilise a steep slope that separates a main section of an interstate and a maintenance station. The existing slope was 21 metres high with a gradient of 1.7 Horizontal: 1 Vertical (1.7H: 1V) and in some locations 1H: 1V.

A six-metre section at the top of the slope had previously been reinforced with geosynthetic materials. However, due to overland flows, snow loads and poor soil conditions, the unprotected section of the slope developed shallow plane failures that were approximately one metre deep. Caltrans was concerned that the slope would slough, affecting both the interstate and a road used to access the maintenance station.

ARMORMAX® Engineered Earth Armoring System was used to stabilise the slope. ARMORMAX consists of PYRAMAT® 75 High Performance Turf Reinforcement Mat (HPTRM) secured with Engineered Earth Anchors to lock soil in place and provide immediate and permanent erosion protection for up to 75 years. For this project, both 1.8 metre and 2.7 metre anchors were used. The anchors are corrosion resistant and designed to provide resistance to shear and lateral forces.

An analysis showed that using ARMORMAX 75 improved the factor

of safety over the unreinforced condition, and significantly reduced the probability of failure for the given soil parameters. The factor of safety is a ratio of the forces resisting movement to the forces driving movement, or the forces that initiate soil mobilisation associated with slope failure.

For more than a decade, ARMORMAX has been used to reinforce embankments and slopes to protect transportation infrastructure. While it has most commonly be used to protect roadways, this same technology can be used to protect railways from slope instability.

One reason that ARMORMAX was selected by Caltrans is that is has a lower carbon footprint than methods traditionally used for slope stabilisation such as rock riprap. One square metre of its HPTRM has a cradle-to-grave carbon footprint of 2.7 kgCO2e. Comparatively, the carbon footprint of concrete-based alternatives is up to 10 times higher, and rock riprap is up to 30 times higher. The carbon footprint of for the HPTRM is verified by an independent third party, which certified that it meets criteria for The Greenhouse Gas Protocol (World Resource Institute), PAS 2050:2011 and ISO 14064-3:2006.

Transportation requirements are a main factor contributing to the difference in carbon footprint. Projects that utilise ARMORMAX require significantly fewer truckloads of material, reducing transportation emissions by up to 95 percent.

While rock is a natural material, its strip mining and crushing for use in engineering projects is often done without regard for environmental impact. ARMORMAX is manufactured in a facility that is ISO 14001 certified. This international certification recognises companies that are actively measuring environmental impact and continuously looking for way to reduce their carbon footprint.

Once installation is complete, ARMORMAX promotes vegetated reinforcement. The system is engineered with a patented trilobal design that locks seeds and soil in place to promote rapid root development for long-term vegetation. This helps to decrease sedimentation and pollutants and encourages infiltration of water back into the ground's water table. These are two reasons why the Environmental Protection Agency (EPA) has identified systems that utilise HPTRMs like ARMORMAX as a Best Management Practice (BMP) for improving water quality. Conversely, rock does not promote vegetation and offers poor filtering and pollutant remove capabilities.

There are some environments where vegetation is sparse. UV degradation is one of the most common failure mechanisms of permanent vegetated armouring systems, often led by insufficient UV resistance and tensile strength (Koerner et al. 2005, Li and Khanna 2008). UV resistance is reported as a percent of tensile strength retained of a HPTRM after a certain period of accelerated UV exposure when compared to the original tensile strength of the HPTRM. Per ASTM D-4355, the HPTRM component of ARMORMAX has 90 percent retention at 3,000 hours and 6,000 hours. This is six times greater than the UV protection provided by conventional turf reinforcement mats, making it ideal for environments with little to no vegetation.

For more information about ARMORMAX, please contact Randy Thompson at Randy.Thompson@PropexGlobal.com

Before


After

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Global Railcar Mover Group Expands the Definition of Safety

In a time when safety extends far beyond automatic shutoffs and signal lights, to the lives and livelihoods of so many, the Global Railcar Mover Group is proud to meet these new challenges. This year has brought forth adversity in the form of a global pandemic, the likes of which the world has not seen in more than a century, if ever.

Nevertheless, Trackmobile, Zephir S.p.A. and LEAF Locomotive have weathered the storm and thrived under the aegis of the Global Railcar Mover Group. As essential businesses, all three companies have continued to produce high-quality equipment designed to keep the economy in motion, while also prioritising employee safety. From complying with the Italian government's quarantine requirements to implementing new health and safety procedures in manufacturing facilities, the Global Railcar Mover Group has continued to pursue two of its founding principles: innovation and safety.

Along with caring for employees, the Global Railcar Mover Group has continued to care for customers, most of whom are essential businesses themselves. In the interest of preserving essential industries and ensuring the continued flow of commerce for overall economic health, sales and support have remained available to all new and prospective clients. In North America, where railroads are still the lifeblood of the economy in so many ways, companies that rely on railcar movers and locomotives have to stay operational. The Global Railcar Mover Group has always promised reliability, high uptime, and continuous customer support. Now more than ever, those promises are vital.

Recent circumstances have made it difficult to shop for new equipment or cope with equipment malfunctions. Economic stressors have created very little room for error, especially in those industries and businesses that provide essential goods and services. The Global Railcar Mover Group's strong international dealer network aims to make these unavoidable events as stress-free as possible. Particularly in North America, dealers and authorised service technicians are never far away.

The unique value of the Global Railcar Mover Group is more relevant than ever: a solution for any rail application. Facing economic strain and compressed timelines, companies no longer have the luxury of perusing from one highly specialised company to another, or of choosing a machine that is anything short of exactly what they need. The Global Railcar Mover Group offers unsurpassed variety, in terms of size, tractive

effort, and power source, making it one-stop shopping for any railcar movement need. Gone are the days when a prospective customer had to contact multiple dealers to explore their diesel and electric equipment options. Now, a single, highly trained specialist can guide each customer through the full spectrum of railcar movement solutions. Rather than choosing from a single product line, a specialist can offer personalised recommendations for which type of machine would best suit a given application beyond tractive effort alone.

In the past, when the Global Railcar Mover Group committed itself to increased safety, that primarily referred to the safety features included on its products. Now, however, there are new concerns to be addressed: the health of employees during a global crisis, and the security of the economy during a time of potential financial insecurity for so many around the world. The Global Railcar Mover Group is not part of the health or medical science industry, so the larger issues of curing and preventing cases of the coronavirus are far outside of its purview. What the GRMG can do, and what it is committed to doing moving forward, is care for the safety of its employees and the safety of the essential industries that power the global economy. In 2020, that is what safety means to the Global Railcar Mover Group.

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Remaining Resilient in Hard Times

Altro's Serge Townsend discusses ways to rebuild confidence in public rail services post-pandemic

As we start to move towards an end to the pandemic, one thing is certain: the world has changed.

Even though we're all sick and tired of hearing the phrase "the new normal", we've all found a change post-lockdown that we actually quite liked. Maybe it's catching up with people we'd rarely find the time to speak to on video calls, or going out less and making the time to fix that squeaky door that's always bothered us. Perhaps it's something as small as just having to drive less? We hope so, anyway! There's no denying that a return to normality offers a great opportunity for rail operators to build the public's confidence in rail travel and attract a new cohort of rail users. What if the rail industry's positive post-pandemic change was for greater hygiene and cleanability on board? We caught up via video call with Altro's Global Commercial Manager, Serge Townsend, to find out exactly what this could look like.

"*Carpet is a staple on most intercity trains, and even some commuters, in the UK,*" concedes Townsend, "*since it gives that comfy, homely feel. But in these times, can we really justify the compromises carpet makes in terms of hygiene?*"

The point that Townsend makes is really quite sobering. Carpet by definition is highly absorbent and designed to trap dust and dirt. Uncomfortably, this also extends to bacteria and viruses. Intended to be cleaned by vacuum rather than with detergent, this leaves behind potentially harmful bacteria and viruses to proliferate between the soft fibres. In order to kill viruses, surfaces must be cleaned at a temperature of fifty-six degrees Celsius or higher – yet most carpets cannot be cleaned at a higher temperature than fifty degrees without damaging them. Furthermore, to allow for the introduction of new soiling, surfaces must be properly cleaned at least once every twenty-four hours. When some carpet products can take up to twenty-four hours to dry fully after a hot-water clean, operators with carpet installed are looking at potentially losing vehicles for whole days of downtime.

"*It is important now, more so than ever, for operators to make a demonstrable effort to show*

"It is important now, more so than ever, for operators to make a demonstrable effort to show passengers the steps they are taking to keep them safe when travelling by rail."

passengers the steps they are taking to keep them safe whilst travelling by rail," Townsend asserts. The answer, he says, is a resilient rail flooring.

"*The main advantage with a resilient floor, be that acrylic or rubber, is how easily, quickly, and* ***effectively*** *it can be cleaned. With a robust cleaning regime, you aren't tied down to any extra downtime and your passengers aren't exposed to any extra risk from harmful microorganisms trapped in the floor covering,*" Townsend says.

With a resilient floor, such as Altro Transflor Motus™, dirt and bacteria sit on the surface, ready to be whisked away by a mop and detergent between services, and won't be sticking around to cause problems later. A rubber or acrylic floor is not only durable against scuffs and scratches, but also against higher cleaning temperatures and stronger detergents, allowing operators to clean at the level needed to keep their vehicles hygienic and their passengers safe from bacteria and viruses. Even better, Altro transport floors are all rigorously tested for colour fastness, so the extra cleaning needed at a time like this won't take its toll on the aesthetics of the vehicle. Best of all, a rubber or acrylic floor will air-dry far faster than carpet, leaving the vehicle free to go back into service.

A survey by UK independent watchdog Transport Focus showed that at the height of the pandemic 40 percent of passengers had serious concerns about returning to public transport. Does Townsend see the introduction of more hygienic interiors as a way of combatting this loss of confidence?

"*Absolutely,*" Townsend nods emphatically. "*Environment is key, and first impressions matter. It's the same as with a restaurant, or a hotel room. If it's dirty, we don't want to come back, do we? Especially at a time like this, passengers are going to care more than ever before about the state of their surroundings. We're incredibly lucky to be able to work with our sister company, Autoglym, to bring our customers the most up-to-date expert advice on cleaning and hygiene.*"

"*And it's not just helping to build passenger confidence back up,*" *Townsend continues. "Even before the pandemic we were encouraging people to take public transport rather than their own private vehicles to protect the environment. Wouldn't it be great if, by attracting new passengers at this time, we could use this time of change to affect a longer-lasting cultural preference towards public transport? If we take this time now to show that we are listening to our passengers and doing all we can to protect them, that's got to pay dividends for the future.*"

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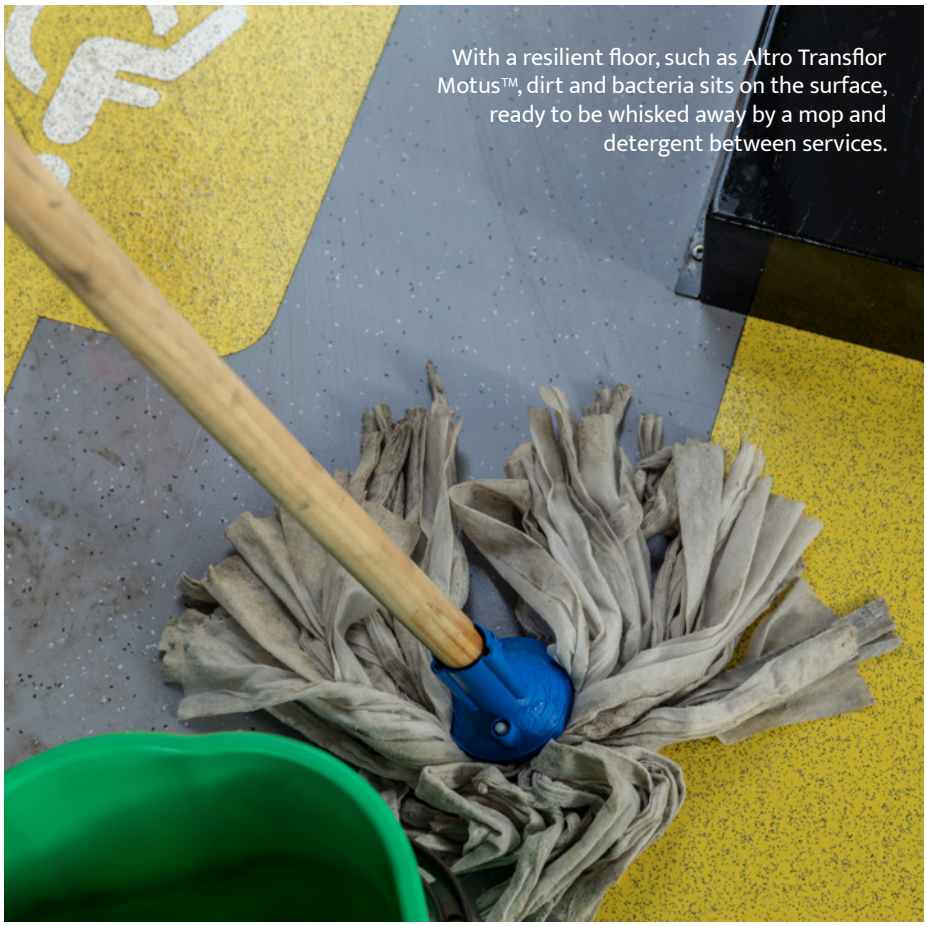

With a resilient floor, such as Altro Transflor Motus™, dirt and bacteria sits on the surface, ready to be whisked away by a mop and detergent between services.

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Premium Power Supplies for Rail Applications

Premium PSU has been designing and manufacturing an extensive range of energy-conversion solutions for rolling stock applications for over 39 years.

Having a high-performance, reliable, compact and robust power supply system is key when working under moving and demanding environmental conditions that can seriously damage electronic assemblies and affect passenger comfort.

Premium's power supplies are high-performance reliable solutions that can be customised to meet specific mechanical and standard requirements. Premium offers a wide range of products that includes DC/DC power converters, DC/AC sine wave inverters and AC/DC power supplies that meet market standards (EN50155 and EN45545-2 amongst others) with a 5-year warranty and long life expectancy.

DC/DC Power Converters:

- 50–2000W power
- Oring available
- Wide input-output combinations
- High input-output isolation
- Easy to install (wall mount, DIN rail, rack mount...)
- Current sharing & hold-up time options available
- Cooling through natural convection, conduction or internal forced air

DC/AC Sine Wave Inverters:

- 1 phase and 3 phase models available
- 180–6000W power
- High power density
- High efficiency
- Configurable power & soft start
- Parameters set and monitoring through included tool
- Chassis and rackmount installation

Custom Design

Whether a standard product needs to be modified or a whole new design needs to be developed to meet the needs of a specific project, Premium is the perfect partner. 900 designs in the market, know-how in mechanical and circuit layout and expertise in power conversion systems is what allows Premium to develop custom solutions in a short period of time.

Manufactured in Barcelona, Powering the World

All projects, from concept and design to testing, manufacturing and homologation are carried out in Barcelona under the strictest quality controls and using the most advanced testing systems.

www.premiumpsu.com

Premium
Powering Your Challenge

NEVER RUN OUT OF BATTERY POWER AGAIN.

CVS-280 | NEW LOW-VOLTAGE BATTERY STARTER FOR LIGHT RAILS

Get power straight from the catenary line when batteries discharge and avoid all hazards related to starting the vehicle

GENERAL FEATURES

- **280W** continuous power
- **400/1100V** voltage range
- **3kV** falling to 1,5kV for 20ms
- **7kVrms** High input-output isolation
- **4,5kV** falling 2.25kV for 1ms
- **ORing** Output diode
- **600V & 750V** nominal input
- **Approved** EN50163:2006, EN50155:2017, EN45545-2
- **Compact & Robust** design

5 YEAR WARRANTY RAILWAY

Premium
Powering Your Challenge

Learn more at **www.premiumpsu.com**

Follow us

CALENBERG

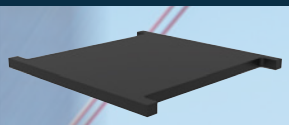
SECURE AND SILENT BEDDING

PERMANENT WAY SYSTEMS PROTECTED BY CALENBERG

High performance rubber material for long-life tracks.

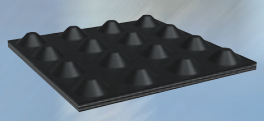
- Suitable for all modes of rail traffic
- Covering a wide range of stiffnesses
- For highly effective mass-spring-systems and low maintenance ballasted tracks
- Waterproof and resistant against weathering
- Good insulation against stray currents

RAIL PADS
BASE PLATE PADS



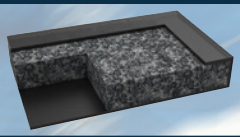
USM 1000 W

USM 2000-3000



USM 4000

USM 1000 G



EPDM SHEAR
CAM PAD

VISIT OUR STAND

27 - 30 April 2021

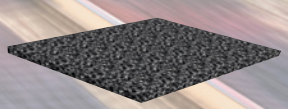
InnoTrans 2021

Stand no. 740 | Hall 5.2

InnoTrans

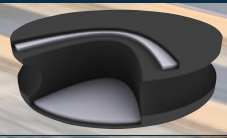
CIFLEX

CIPROTEC



DIRECTIONAL
CONTROL BEARING

MSS BEARING



Calenberg Ingenieure GmbH
Am Knübel 2-4 | 31020 Salzhemmendorf Germany | Tel. + 49 51 53 - 94 00-0 | info@calenberg-ingenieure.de | www.calenberg-ingenieure.de
A LISEGA Group Company

Elastomeric bearings for track

Long-term support of structural components

For more than 45 years Calenberg Ingenieure has been dedicated to the refinement of building construction. The product range comprises special elastomer materials for special fields of application in sound and vibration reduction. Calenberg expertise reduces the risk of building damage thereby reducing maintenance costs, improves the living quality and protects against environmental effects such as traffic noise, vibration and impact sound. The demand for a higher standard of living quality today is not only defined in material values, but also as a sense of well being, regard for fellow man and maintaining traditional values.

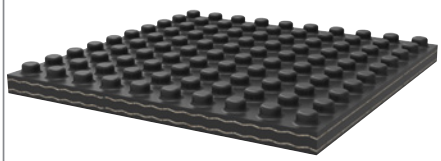
Vibrations are perceptible oscillations that are not only disturbing to human beings but may also lead to disturbance and damage to apparatus and other installations in buildings. Structure-borne sound can radiate in a building as secondary airborne sound and considerably influence the well being of humans.

Product range for track

USM® 1000 W

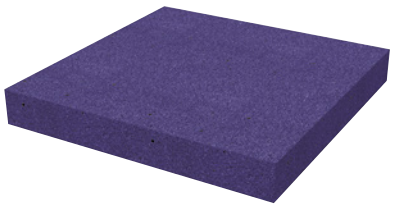
USM® 2000 + 3000

USM® 4000

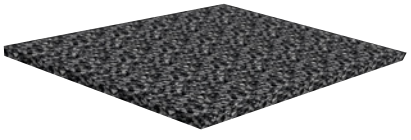


USM® G 1000

CIFLEX



CIPROTEC



Rail traffic causes airborne noise as well as vibrations or structure-borne sound. Residential and commercial locations are normally the sufferers of these emissions.
Calenberg Ingenieure use elastomeric products for their rail track program. They are produced from high grade natural and synthetic rubbers. Due to the different variants within the product range, individual solutions for nearly every vibration and noise problem can be offered.

Why are there vibrations on the track?

Wheels are noncircular, eccentric, unbalanced and have flat areas. The rail track is not perfectly straight and even due to the construction method and due to subsoil conditions. The track which has integrated vibration control offers an effective relief. At this point an elastomeric track bed mat or under ballast mat can be an important part e.g. of a floating slab track or mass spring system. It also has the big advantage of increasing the durability of the track system, which reduces the maintenance costs of the track as well as of the rolling stock.

Our product range

Micro cellular elastic EPDM rail pads and base plate pads are both important resilient parts of rail fastening systems. Rail pads are installed directly under the rail foot to increase the elasticity of the ballast track. This brings about a more comfortable ride and protects the permanent way, from standard gauge railway to tram way. The elasticity to slab track systems is brought about by high elastic micro cellular EPDM base plate pads installed between rib plate and concrete slab.

USM G 1000 series mats are used for all track types, speeds and axle loads up to 25 t, mainly for ballasted track. Different mat rigidities provide efficient structure-borne sound and vibration protection adapted to the needs of each specific track situation. Moreover, the ballast is protected effectively against premature wear. The mat has an isolating layer made of bound rubber granules which is covered from all sides by wear-resistant, water-tight and weatherproof solid rubber layers, protecting the isolating layer and ensuring the product's long service life.

USM 1000 W, 2000, 3000 series are under ballast or track bed mats for tram lines, light rail, underground, metro/commuter, main line railways, covering the whole variety of speeds and axle loads. They are high resilient, water-, weatherproof and hence long-lived solid rubber mats with hard-wearing top and truncated cone-shaped spring elements on their underside. Due to their low dynamic stiffening these mats are ideal for floating slab tracks or mass-spring-systems.

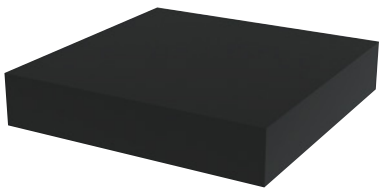
USM 4000 series are studded solid rubber ballast mats of higher stiffness mainly used for high speed or heavy-duty railway lines and transition sections.

Special product for environmental protection

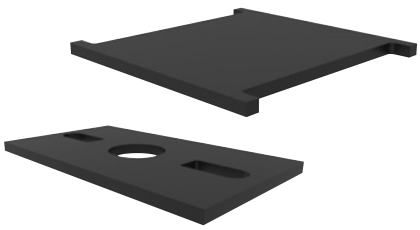
The OIL-EX Absorption Mat binds harmful substances such as oil or other hydrocarbons within its top layer. On the reverse side an impermeable sealing layer ensures that earth and ground water are not contaminated by e. g. parking rail or road vehicles with oil leakages. And because the OIL-EX mat is mainly made of recycled material, it is eco-friendly in two ways.

www.calenberg-ingenieure.de

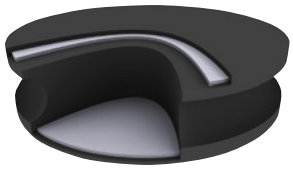
EPDM SHEAR CAM PAD



RAIL PADS/BASE PLATE PADS

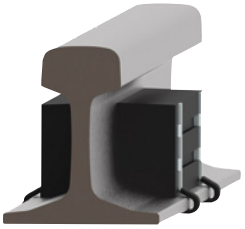


MSS BEARING

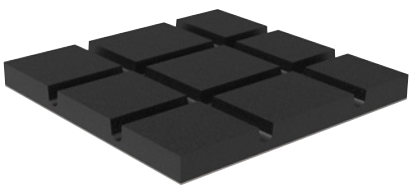


DIRECTIONAL CONTROL BEARING

RAIL DAMPER



OIL-EX ABSORPTION MAT



FreiLacke

System coating solutions for rail vehicles

Certified solutions of the highest quality.

FreiLacke has stood for innovative paints and coatings since 1926. The family-owned company has already entered its third generation and develops customised solutions for clients from the wheel and vehicle manufacturing industries, as well as those in the fields of mechanical and apparatus engineering, job coating, functional furniture, rail vehicles, wind power, storage technology, construction and sanitation, directly through its 600 employees at its Döggingen base in the Black Forest.

As a modern family-run company now in its third generation, the safeguarding of the head office is just as important as our worldwide sales and our international subsidiaries and partners.
The product range of Europe's leading system coating provider covers the entire spectrum from industrial coatings, powder coatings and electrodeposition coatings to composite solutions.

International sales are handled by a global network of subsidiaries and partners around the world.

Environmental protection has always been a key priority for **Frei**Lacke.
Therefore, the company makes every effort to develop environmentally friendly products, reduce emissions, packaging materials and waste and use resources sparingly.

Applied **solutions.**
www.freilacke.com

FreiLacke

System coating solutions for rail vehicles

Certified solutions of the highest quality.

The strict quality requirements of the national railways and the train manufacturers require certified coating systems of the highest quality.

FreiLacke offers diverse and certified system coating solutions in the areas of powder coatings, liquid coatings and composites for exterior and interior. All solutions are produced from one source, perfectly matched to each other and ensure ideal processing and the highest quality.

Our powder coatings fulfil the German Railway Standard (DBS) 918 340 and our liquid coatings fulfil the DBS 918 300 quality standard. We also have fire test certificates available in accordance with the European standard EN 45545-2.

Applied **solutions.**

www.freilacke.com

Visit us.

Hall 8.1 | Stand 210

InnoTrans

Building Next-Generation Rail Applications

with ADLINK Railway Solutions

No method of modern transportation beats the longevity of trains.

As technological achievements have given us the internal combustion engine, helped conquer the skies, and put humans on the moon, railways have remained a steady constant. Indeed, trains and railways remain a vital component of infrastructures around the world. From freight delivery across sprawling American landscapes to the advanced rail transportation networks of Chinese, Japanese and European cities, hundreds of millions of people rely on rail transit each day. Railways also remain a reliable, cost-effective method of shipping freight.

Steady progress and innovations continue to improve both trains and terminals. Although consumers and the media typically focus on automotive advances, modern trains similarly benefit from numerous enhancements. For instance, major railroad companies regularly rely on wind tunnel testing and advanced fuel management systems to maximise performance, fuel efficiency and emissions control. They require cutting-edge technologies as much as other transportation industries, including robust computing capabilities.

As a trusted manufacturer of powerful and reliable computer systems with over 25 years of experience, ADLINK specialises in serving markets with unique and often extremely challenging considerations. Thanks to its in-house design and manufacturing, ADLINK has developed an impressive portfolio of cost-effective commercial off-the-shelf (COTS) components able to withstand punishing environmental conditions and non-stop use without compromising quality. With field-proven and reliable solutions in both onboard and wayside applications for both brownfield and greenfield projects, ADLINK excels at delivering technology upgrades and insertions, supply longevity, COTS and ODM (customisation) capabilities, and maximum business flexibility for train control, rail signalling, automation, and digitisation.

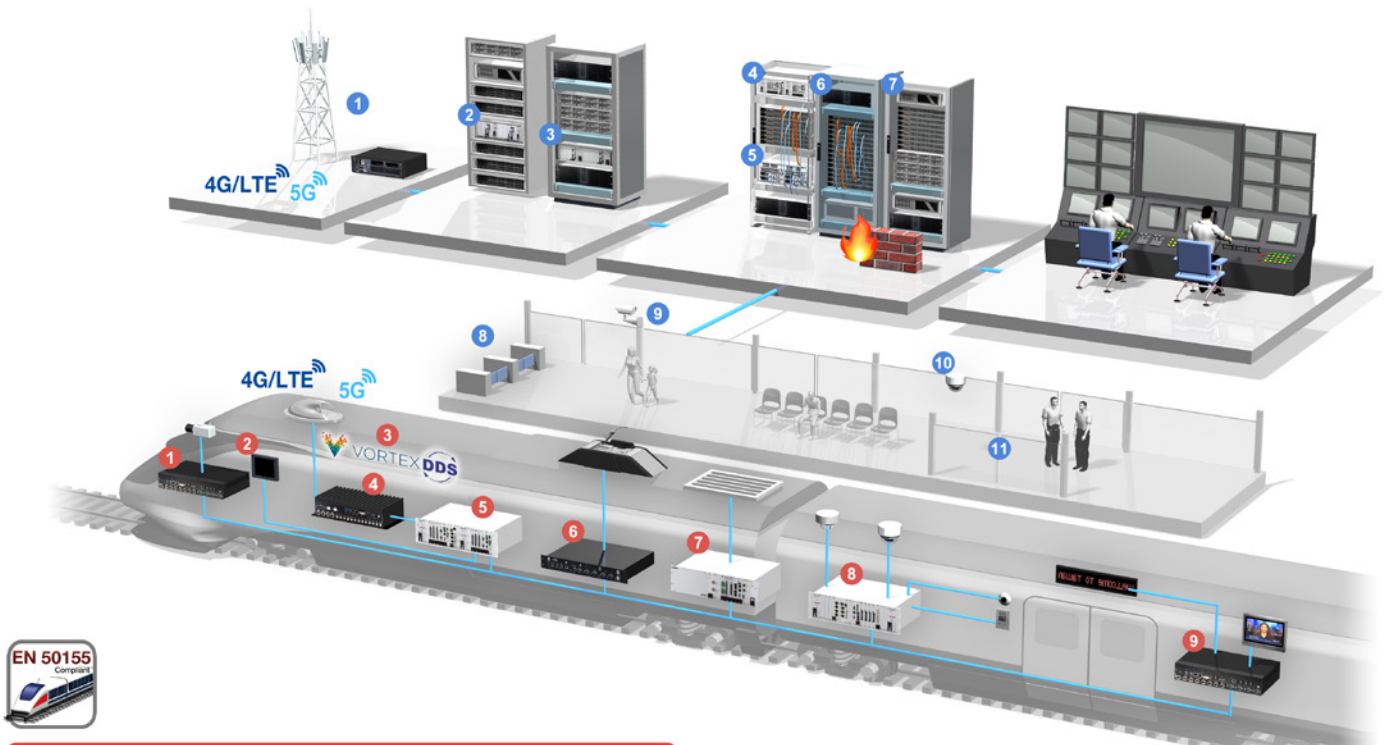
Embracing Current Standards & New Technologies

In order to survive the rigors of railway transportation, electronics and computing devices require engineering considerations and rugged construction that go beyond consumer equivalents. Brutal conditions can include unexpected shocks, high levels of vibration, humidity, and temperatures beyond what standard components can tolerate.

Rail transit service providers, freight shipping companies, and other related businesses might deploy conventional, non-rugged computing solutions to improve the efficiencies and effectiveness of their operations, but device failure can have disastrous consequences.

ADLINK understands that railway customers need to know that hostile environmental conditions can't compromise essential computing components. Our engineering and development teams are dedicated to ensuring that our railway products adhere to the important EN50155 "Railways Applications Electronic Equipment Used on Rolling Stock" standard. These stringent requirements stipulate thresholds and ranges for a variety of factors, including humidity, vibration, shock, and temperature. ADLINK components, panel computers and other EN50155-certified computing systems are ready for deployment in railcars, passenger terminals, and many other transportation settings. ADLINK is committed to enabling customers to focus their development efforts on differentiating their end applications, mitigate budget constraints, shorten design cycles, and speed up time-to-market Several of ADLINK's railway products go even further by meeting or exceeding several military-standard specifications. Operating in virtually every environmental condition on the planet, the military relies on electronics meeting MIL-STD requirements that are able to function reliably in extreme heat or cold, high-dust, and high-moisture conditions. With leading technical know-how in designing military-standard compliant embedded computing boards and systems for

Leading COTS/ODM Solutions for Train Control, Rail Signaling, Automation and Digitalization



Onboard Applications

1. AI-enabled Video Analytics for Railroad Hazard/Intrusion Detection
2. Driver Machine Interface (DMI)
3. Data Distribution Service (DDS)
4. Train-to-Ground Communications Control Unit (CCU)
5. Automatic Train Operation (ATO)
6. Locomotive Data Recorder
7. Train Control & Monitoring System (TCMS)
8. Rugged Storage Systems for Video Surveillance
9. Passenger Information System (PIS)

Wayside Applications

1. Multi-access Edge Computing (MEC)
2. Radio Block Center (RBC)
3. Computer-based Interlocking (CBI)
4. Centralized Traffic Control (CTC)
5. Network Security Server
6. Automatic Train Supervision (ATS)
7. Video Processing Server
8. Automated Fare Collection (AFC)
9. Facial Recognition
10. Platform Video Surveillance
11. Platform Screen Doors (PSD)

ADLINK delivers a comprehensive portfolio of ground-breaking modules and systems optimized for the railway transportation industry to deliver extreme performance, unfailing reliability, and ironclad ruggedness

ADLINK AI-enabled Video Analytics Platform

Harness AI technologies and deploy smart, rugged, real-time graphics/video applications vital to today's increasingly complex railway operations

mission-critical applications, ADLINK harnesses its field-proven reliability and ruggedness that is deeply rooted in the company's core values, and delivers components that provide exceptional performance wherever the rails lead.

The company's strong position and extensive experience in the CompactPCI market gives it unmatched expertise in developing and manufacturing CompactPCI solutions for a wide range of demanding industries and advanced technologies. As these sectors increasingly turn to artificial intelligence (AI), the Internet of Things (IoT), and edge computing, ADLINK is able to provide these markets with powerful offerings that sustain legacy technologies while spearheading new innovations.

ADLINK's Rugged by Design hardware survives where other manufacturers fall short, but ADLINK focuses on more than resilience. As a Premier member of the Intel® Internet of Things Solutions Alliance and an NVIDIA Quadro Embedded Partner, OEM Preferred Partner and Jetson Elite Partner, ADLINK has unique access to the latest CPU and GPU technologies as well as the highest levels of technical support from Intel and NVIDIA. As a result, ADLINK has designed railway solutions with small form factors to ensure powerful systems in deployments throughout trains and terminals, making them ideally suited for AI, IoT or edge computing applications, and thus continuing the company's mission to drive smarter, safer, and more reliable rail operations.

ADLINK Leading Railway Solutions

As a new decade begins, public and private rail transit providers can invest in a variety of computing equipment for deployment in railcars, terminals, and other areas critical to railway operations. ADLINK has decades of experience developing hardware that's Rugged by Design and thus ideally configured for the frequently punishing operating conditions railway environments can present. The resulting product stack features best-in-class components backed by ADLINK's industry-leading customer service. ADLINK also regularly works with its customers to build customised solutions tailored to their exact needs. With a deep understanding of how important supply longevity is to the rail industry, ADLINK ensures best practices in product obsolescence and life-cycle management by fully leveraging its long-standing strategic partnerships with major hardware component and software vendors

Transforming the Rail Industry with Edge AI

With AI and IoT technologies being widely adopted in the railway industry, railway operations are becoming safer, smarter and more reliable, significantly enhancing the passenger travel experience and freight logistics services. ADLINK's AVA-5500 Series AI-enabled video analytics platform represents a comprehensive and versatile solution that brings the advantages of AIoT (AI and the IoT) and EVA (Edge Video Analytics) to power next-generation intelligent rail applications.

Use Case: Edge Video Analytics (EVA) Enabled Railway Obstacle Detection

Although the world's rail systems safely transport millions of passengers to their destinations every day, real risks remain, and the consequences can be serious. Derailments, terrorist attacks, and other dangers are unfortunate occurrences that railways systems and operators must anticipate and prepare to mitigate. Modern security requires an advanced, multi-pronged approach, where AI, machine learning, edge analytics, the IoT, predictive and reactive analytics, and wireless communications seamlessly come together to give professionals a comprehensive understanding of potential vulnerabilities.

ADLINK is at the forefront of bringing robust, military-grade hardware to rail systems integrators around the world. With extensive experience in developing Extreme Rugged computing platforms for defence, industrial, and other verticals, ADLINK provides essential components that meet performance requirements for real-time, multi-stream video analytics that are able to operate in environments where shock and vibration, electromagnetic interference, extreme temperatures, and other conditions are common.

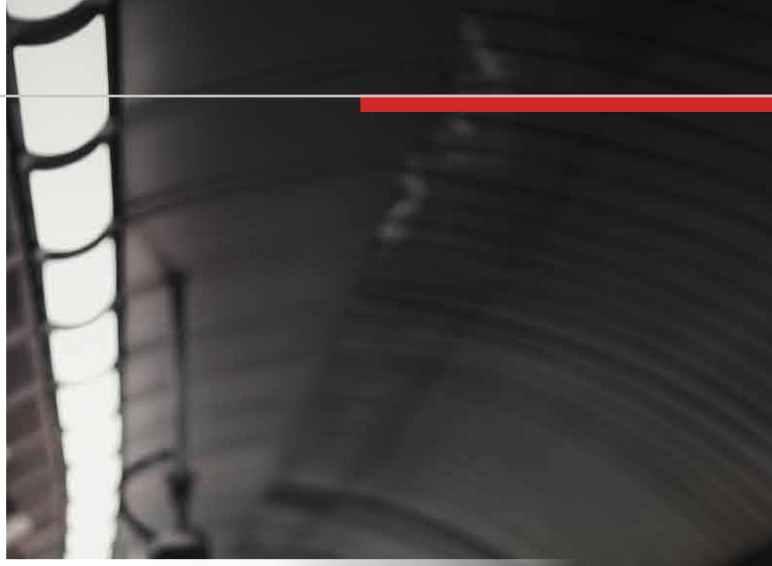
Recently, ADLINK's expertise proved to be an ideal match for a European railway customer that had developed a railway obstacle recognition system. The customer's requirements were substantial. Their system relied on a combination of optical radar, digital cameras, and a host of sensors to identify railway failures or other obstacles by leveraging AI-based processing algorithms. The graphics processing load for this application was immense.

As the latest EVA product designed to perform video analysis in real time at the edge, ADLINK's industry-leading AVA-5500 AI-enabled video analytics platform met the challenge. The system's powerful GPGPU-assisted AI processing and software support helped the railway customer optimise their applications according to their needs. Thanks to the AVA-5500's EN-50155-certified Extreme Rugged construction, it was also ready for immediate deployment where the railway obstacle recognition system would operate.

The AVA-5500 platform's success in real-time rail obstacle detection makes it equally suitable for a similar role in a railway terminal or deployed in other specialised rail inspection cars. Featuring quad-core Intel processors (Core™ i7-6820EQ or Core™ i7-7820EQ) and an NVIDIA Quadro GPU, the AVA-5500 is equipped for modern, demanding video processing work of all kinds. It has a host of storage and connectivity options, all housed in a rugged, fanless chassis that protects its internal components from damaging environments. ADLINK works closely with its other customers in the transportation industry to configure and deliver AVA-5500 platforms to meet specific and unique needs.

Video: *ADLINK's AI-enabled Video Analytics Platform Driving Safer and Smarter Rail Operations*

ADLINK
Leading EDGE COMPUTING



Forward into the Future

ADLINK Railway Solutions

ADLINK is committed to helping rail integrators and application developers focus on differentiating and transforming their end applications in train control, rail signaling, automation and digitalization, ultimately driving safer, smarter, and more reliable railway operations.

intel IoT Solutions Alliance Premier

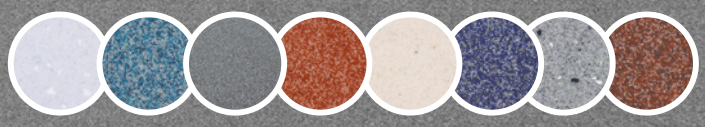
NVIDIA PREFERRED PARTNER

ADLINK Technology GmbH
Tel.: +49 621 43214-0
Germany@adlinktech.com
www.adlinktech.com

BAULTAR

Baultar is a Canadian company that creates and manufactures innovative products for the transportation industry (railway freight, railway public transit, buses, infrastructure). Baultar's flooring division offers an advanced flooring system called Abrastop™. The Abrastop™ family of composite products, specifically designed for the transportation industry, ranges from floor coverings to complete flooring systems. It integrates many different options that can be tailor-made according to the technical and design needs of clients. These flooring solutions have two main objectives: to offer superb durability that reduces maintenance requirements and life-cycle costs, and to simplify product procurement and vehicle manufacturing by offering an all-in-one solution that integrates functions seamlessly, maximizing the value for the client.

Photo credit: L.A. Metro



CUSTOMIZABLE COLOURS

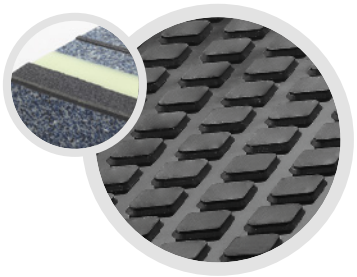
ADVANCED FLOORING SYSTEM

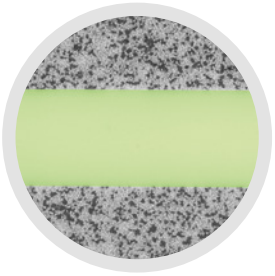
HEATING

The advantages of an Abrastop™ Foam radiant heating floor include: uniform temperature distribution throughout the whole vehicle, superior comfort, thermic inertia that keeps passengers warm even when doors open, elimination of the discomfort caused by drafts from forced-air systems, and energy savings.

AddGRIP SURFACES

In certain access areas, where additional anti-slip properties are needed, areas and/or bands with custom-made patterns can be integrated. Also, the surface grit can be adapted using a variety of different materials.





PHOTOLUMINESCENT BANDS

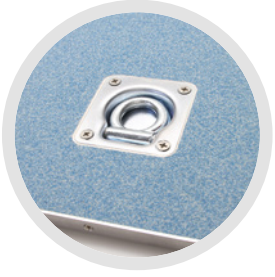
Guide and demarcate specific areas with integrated passive high-performance photoluminescent lighting (HPPL) – staircases, walkways, doors, or specific areas with a particular function (such as an area for storing bikes) are just some examples.

3D BANDS AND SURFACES

Alert, guide, demarcate. Raised profiles of many different kinds help alert passengers to upcoming hazards, provide them with guidance for safe passage or exit, and/or delimit a specific area of a vehicle.

LOGOS

Of any kind or colour, integrated logos are manufactured using the same materials as the flooring panels. Sizes and shapes can also be adjusted for any type of request.



INSERTS

Adding even more durability and adaptability for specific uses. Trap doors, supports, reinforcements, and mechanical fastening inserts, are just a few of the possibilities for fulfilling specific needs with metal pieces.

COVE MOULDINGS

A proper finishing touch and a streamlined look. Can be used for anything from meeting functional needs (such as covering joints, transitioning between flooring and walls, and facilitating cleaning) to serving more decorative purposes, such as fitting different styles.

ADVANCED FLOORING SYSTEM

All-in-one
Customizable
High-performance

BAULTAR

110 J.E. Lemieux, Windsor, QC J1S 0A4 CANADA
+1 819 845 7110 marketing@baultar.com www.baultar.com

Connecting everything

Nomad Digital

ROCM

Remote Online Condition Monitoring

Using On-Board Diagnostics to reduce costs and improve customer service

Our flexible ROCM solution provides real-time and in-depth information, providing fleet operators and owners the intelligence and time required to take pro-active action.

- Increased **reliability** and **availability**
- Rich in **functionality**
- **Improved safety** and significant **cost savings**
- **Reduced** vehicle **downtime**
- Near **real-time diagnostic alerts**

Get in touch

E: experts@nomad-digital.com
W: nomad-digital.com

Follow us

@NomadDigital

How Remote Online Condition Monitoring (ROCM) Is Influencing the Railway Industry

Over the last two decades, maintenance within railway has evolved considerably, influenced by technology, globalisation and the awareness that we have limited resources.

Companies are motivated by both financial and performance-related gain, ultimately increasing their efficiency. They're always looking for new methodologies and tools – especially considering that maintenance accounts for 50 percent of the cost of ownership. The number of players and the ecosystem has changed considerably: original equipment manufacturers (OEMs) are investing strongly in services, and benefitting from market evolution (in Europe for example). Maintenance services are a natural space for them to move to.

The maintenance ecosystem varies massively customer to customer, but the industry's shared goal of transporting customers and transporting goods remains. From asset management to maintenance operations, all stakeholders play a key role in the railway transport ecosystem.

Economic Standpoint

The age of the train operator's fleet(s) will be an influential factor, considering hardware capabilities and the cost of implementation versus return on investment (ROI). Fleets produced by the main-stream OEMs in recent years, already come equipped with remote condition monitoring devices and have some capabilities (in the worst-case scenario OEMs will do it for commissioning purposes). Slightly older fleets, with digital control systems, train communication network and train control management systems, often come with a relevant variety of sensors for control and have embedded diagnostics capabilities.

However, fleets built before the 90s have very limited (if any) data sources available; making it more costly to retrofit. The installation of sensors and data acquisition modules on top of the on-board devices required for data processing and transmission equate to higher non-recurring costs.

This recent shift with train builders equipping their trains with these systems comes with the pressing need for asset data services in the railway industry. The real drive behind this is that operators were and still are facing some real challenges. The industry is under the spotlight now (for good reasons) with a higher demand, these new tools now inform and

ensure that the system's capacity is at the highest possible level for the required period. Components on the train will always require maintenance and repair, therefore it is about detecting this at the earliest stage with a goal of repairing whilst having the capacity to do so minimising the impact on service.

Train operators considering implementing ROCM should also consider factors impacting the market financially:

- Cloud-based data storage services are becoming cheaper
- Most assets are already equipped with several data sources: diagnostics and operation
- Generalised usage of data services from mobile network operator's prices are down
- Cost of new sensors is expected to decrease in the future, pushed by market demand
- The Internet of Things (IoT) and the Industry 4.0 era: getting data from your assets is a powerful tool (becoming more common)
- Embedded devices and the edge-computing market are becoming more competitive

Beneficiaries

As stated by McKinsey (Rail) below, OEMs can play a pivotal role within the maintenance rail industry should their services be required. There is an opportunity for them to bid for single tenders and establish themselves within a train operator's business model, with both parties benefiting from the partnership. However, the three main beneficiaries are:

Urban/Regional Passenger Rail

"*Rolling stock OEMs will take on the maintenance for smaller regional and urban rail operators on a service basis, leveraging their currently superior analytical skills and knowledge of the assets and this way putting even more competitive pressure on larger regional and urban rail operators.*"

This allows for the smaller rail companies with limited resources (in comparison to large fleets) to obtain expert maintenance from OEMs, assisting asset management and keeping the trains running more frequently, reducing costs and increasing revenue. By keeping their trains running, they can avoid delays and improve their passengers journey experience.

Cargo Rail

"*Financial investors increasingly invest in cargo leasing companies who tender the maintenance to the most cost-efficient bidder and offer an entry opportunity to rolling stock OEMs. Next to these players, competition increasingly stems from alternative transportation modes (due to cheap fuel prices and automation in trucking). This situation encourages cargo rail operators to make their maintenance as efficient as possible. The same argument as above holds true for controlling the rail operation's value chain: large cargo rail operators need to quickly build up their capabilities with respect to condition-based maintenance (leveraging their knowledge of operational contexts) and realise significant efficiencies in their maintenance.*"

Freight operators face external pressures and struggle on a market that allows for very small profit margins. There is a cry for efficiency and automation at all levels of the operation. With a ROCM solution in place, asset, operations and maintenance management can

work collaboratively together, ensuring train functionality is at the forefront of all operations. With the use of near real-time and historical data, train operators can meet their KPIs by delivering their cargo on time whilst reducing costs.

Long-Distance Passenger Rail

"*In long-distance rail, the competitive pressure is significantly lower compared to urban/regional passenger and cargo rail segments. The transportation market is stable, and autonomous passenger cars are still a relatively far-off reality. Customers more and more ask for a higher-quality transport experience, long-distance rail operators might be incentivised to reduce component failures through condition monitoring. This, next to a significant potential to increase margins, might yet make the case, albeit longer-term, for change in long-distance rail.*"

Long distance is today seen as a competitive alternative to air travel (for distances <2,000km). It is expected that demand will increase, and governments will promote this move, either by subsidising or cutting taxes on train fares. This encourages the train operator to reinvest in one of their KPIs such as improving passenger experience for example (a common goal within the long-distance passenger rail sector).

The End-Results

Remote online condition monitoring provides in-depth and real-time information on the performance of crucial equipment and components on-board – partnered with diagnostic alerts – providing fleet operators and owners with the intelligence and sufficient time required to take pro-active action.

Reduced costs and increased revenue are key factors for many but with such a solution implemented, it is about improving the overall reliability of fleets, which is primary. All trains share the same purpose – transportation, but it is how that raw data from a train is used to reap the benefits. With new trains, masses of data can be gathered and organised to then be filtered/enriched, used in artificial intelligence or by experts, impacting business. This data may be real-time or historical – both are important. For example, historical data can be used by reliability management in identifying trends and patterns, whereas near real-time data can be used for alerting operations and maintenance management of any (simple or complex) issues/failures. If the data being extracted is used properly and correctly, the rewards of this are ongoing, with cost savings and an improved passenger experience.

The global rolling stock maintenance market had been assessed at 45–50 billion euros per year and could have up to 5 billion euros per year of potential savings. The maximum additional savings originated by a predictive maintenance programme are not significant enough yet (currently estimated at a maximum of 10 percent). It is estimated that condition-based maintenance can lead to an overall reduction of at least 10 to 15 percent in maintenance costs and increase efficiency.

The financial benefits obtained from ROCM are apparent, the money saved can be further spent on meeting other KPIs and ultimately enabling that both the train service and asset operation are at its best.

With thanks to Nomad Tech, created as a joint venture between Nomad Digital and EMEF, the Portuguese Railways company for rolling stock maintenance.

EDITORIAL CALENDAR

2021 Railway-News Magazine Schedule & Events

InnoTrans 2021

- Publication date: 22 March
- Content submission deadline: 26 February
- InnoTrans 2021: Messe Berlin, 27–30 April

Railtex / Infrarail

- Publication date: 4 May
- Content submission deadline: 9 April
- Infrarail & Railtex: Birmingham NEC, 11–13 May

Mid-year Show Review (Special section: RailLive review)

- Publication date: 28 June
- Content submission deadline: 4 June
- RailLive 2021: Long Marston, 16–17 June

Railway Interchange / Trako / Expo Ferroviaria

- Publication date: 13 September
- Content submission deadline: 20 August
- Railway Interchange: Indianapolis, IN, 26–29 September
- Trako: Gdansk, 21–24 September
- Expo Ferroviaria: 28–30 September, Milan

AusRAIL Plus

- Publication date: 8 November
- Content submission deadline: 15 October
- AusRAIL Plus: Brisbane, 30 November–2 December

RAILWAY

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Perrone's EnduraLite Synthetic
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A Focus on Hygiene

Travel providers, suppliers, and travellers each have their own role in jumpstarting the travel industry post-Covid-19. As domestic and international travel restrictions are lifted, Perrone Railway continues to take steps towards rebuilding confidence in travel while keeping sustainability at the forefront of the innovative process.

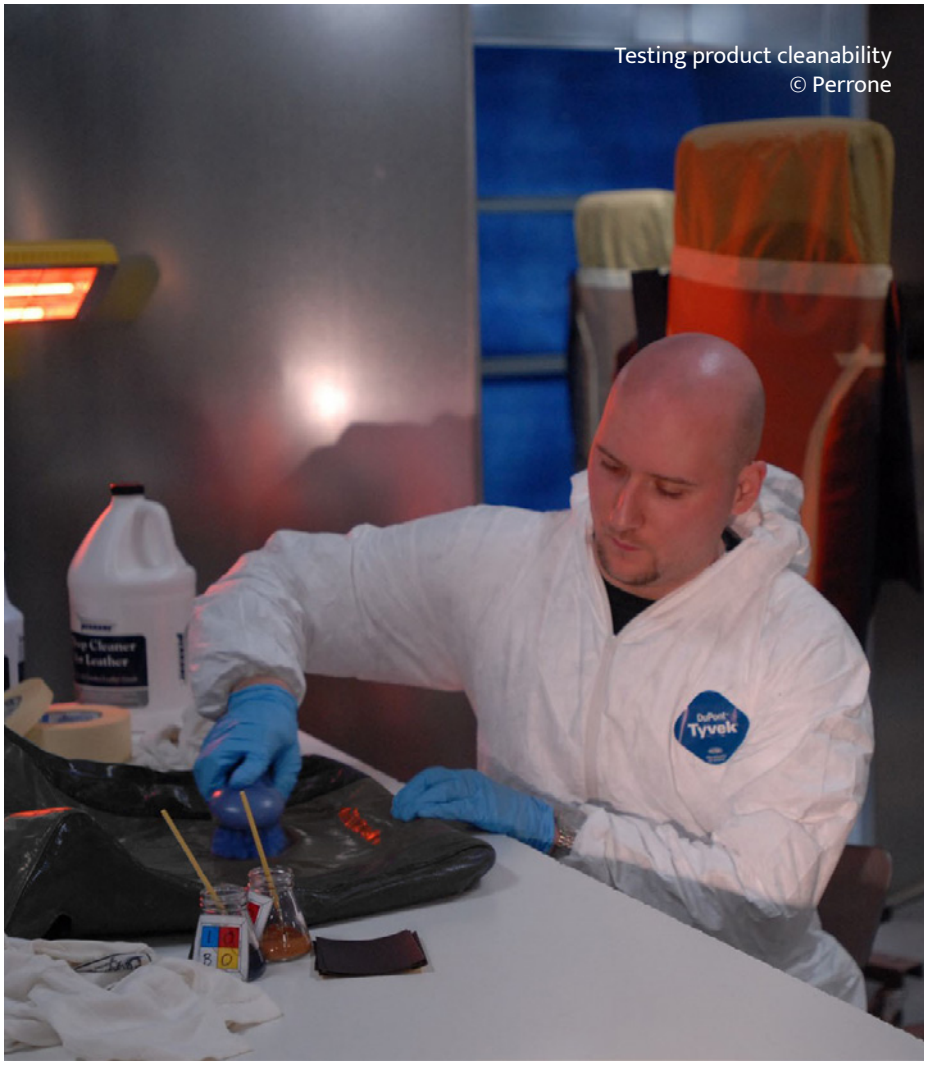
Travel providers are responsible for the development, implementation and communication of effective cleanliness protocols and travellers are responsible for abiding by these protocols to ensure the safety and comfort of their fellow passengers. Suppliers have an entirely different role in ensuring confidence in a safe and sanitary travel environment.

"*The manufacturing industry has been given a chance to reflect on programmes and strategies for rebuilding. We have been granted a unique opportunity to evaluate our goals for post-pandemic recovery and continue to address industry shifts proactively and swiftly. A positive outcome of the last few months is the noticeable boost in collaboration with our partners. From designers, to chemical experts, we are all working towards common goals and solutions with renewed ambition,*" explains Bill Perrone, President of Perrone Railway. "*As suppliers, we will continue to use this unique opportunity to learn and transform the industry for the better for both our customers and the end user.*" Prior to the Covid-19 pandemic, sustainability was the driving force behind rail innovation. "*Our customers and partners have become increasingly aware of the travel industry's impact on our planet, driving the need for a change in industry processes*

and sourcing of goods. Our goal is to produce quality, sustainable products that meet the current market needs," explains Perrone. "*Prior to the pandemic, we had aligned our environmental protection efforts with our business development plan. Our long-term vision continues to focus on efficiency, safety, and quality for our customers and society, while remaining accountable for our environmental efforts. Now, more than ever, we are aware of our surroundings, and the impact our business practices have on the environment and global population.*"

Perrone Railway's line of upholstery products is geared towards passenger use, comfort, and safety. "*We have spent years developing products with the end user in mind. Focuses and priorities have shifted over the last eight months but there is continuity in industry expectations. Regardless of the times or circumstances, products must be certifiable. They must be creative and sustainable, easily maintained, and above all, cost-effective. Today we are addressing the health and safety requirements of the market, and moving forward, we will continue to develop our products with the end user in mind,*" explains Perrone.

Perrone's line of synthetic upholstery continues to meet the needs of the industry regardless of shifting priorities. "*Our synthetic products, EnduraLite and EcoLite, are eco-friendly, non-corrosive, and readily available. Isopropyl alcohol, a common product recommended by the Centers for Disease Control and Prevention, can be used on both products with no visible surface damage. Both EnduraLite and EcoLite are inherently antimicrobial, impeding the growth of pathogenic microorganisms,*" says Marc Cognetti, Perrone's Vice President of Marketing. "*The issue of sustainability has not lost momentum but has levelled with the need to develop new products to meet the needs of our current situation.*" Both synthetic offerings provide more than a 50 percent weight reduction from Perrone's original "eco-friendly" offering, Featherweight Genuine Leather.



Testing product cleanability
© Perrone

The need for a safe, reliable, and eco-friendly means of transportation has not changed as a result of the Covid-19 pandemic. While leisure travel may continue to lag for some time, business travel will continue to steadily increase as offices reopen, and people return to work. Perrone notes, "*We have a responsibility to keep travellers safe while allowing the industry to take steps forward profitably, and sustainably while meeting the current health and safety requirements.*"

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